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BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 9 1954

THE SIGNIFICANCE AND MANAGEMENT OF PSORIASIS*

BY

JOHN T. INGRAM, M.D., F.R.C.P.

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I am honoured by the invitation to deliver the first Watson Smith Lecture, and I recognize my responsibility. The Watson Smith Lecture may be delivered upon any subject in medicine, including dermatology, and I believe this is the only lecture of this College which carries that specific reference. It may be thought to give dermatology some little cloak of respectability.

Attention having been drawn to this branch of medicine, we might ask ourselves why the skin does not figure more significantly in our medical curriculum and training, in the facilities afforded for hospital and medical practice, and in research. The skin is the one part of the whole organism the physiological and pathological processes of which are clearly displayed to view, and, if careful observation is the basis of clinical practice and of research, here is a training-ground which cannot be equalled.

Common sense would seem to urge that, not for the sake of dermatology as a specialty but for the better and easier understanding of medicine as a whole, the doctor in training should be taught to recognize the fundamentals of his subject in the skin. Nothing should happen in the skin which he cannot interpret in general medical terms, and every medical problem should be approached by way of the skin, which has so much to tell.

This College will no doubt use its influence in deliberations on the medical curriculum and on hospital accommodation to improve the position of dermatology, which enjoys much less consideration and poorer facilities in Britain and the Commonwealth than in most other countries. This is only part of the problem of the necessary reorientation of our views regarding the general and the special in medicine in the interests of the patient and for the training of students. It is necessary that men of ability should be attracted to work in dermatology and should reveal truths that lie hidden in the skin and that must bear significantly upon the whole of medicine.

Sydney Watson Smith was a Fellow of this College and of the Royal College of Physicians of Edinburgh, and to both he extended his generosity. He had a high sense of his vocation and was beloved by patients and colleagues. Starting general practice in his home town of Dundee in 1907, he settled, after service in the first world war, in Bournemouth, and was appointed a consulting physician to the Royal Victoria and West Hants Hospital in 1924. In common with most of us who are Fellows of this College, Watson Smith's contributions to medicine were modest; he did not flaunt an international reputation, but he gave of his experience and philosophy in some 40 papers in our medical literature, many of which were on dermatological subjects. His address as President of the Annual Meeting of the British Medical Association in Bournemouth in 1934 was on "Climate and Health" (Watson Smith, 1934) and is relevant to the subject of my lecture to-day.

*The Watson Smith Lecture delivered before the Royal College of Physicians on January 11, 1954.

A Common Disease

Psoriasis affects all sorts and conditions of men and women, of all races and creeds, all strata of society, rich and poor, wise and foolish, the hungry, the well-fed, the sick, and the sound. In temperate climates it is the most prevalent skin disease after eczematous dermatitis. It is also a fascinating disease, creating, from guttate and small nummular beginnings, plaques and such colourful arcuate and figurate patterns as may rival the heavens for beauty and design.

In ancient literature this term "psoriasis," which indicates an itching, scaly affection, was used to cover a range of skin diseases including pyodermia, scabies, and leprosy. In the early part of the last century Robert Willan, of Yorkshire, the acknowledged father of modern dermatology, first gave a full and accurate account of the disease, but it is only in the last hundred years that the use of the term has been restricted to the disease as we know it. Yet so common is the disease and so distinctive its features that it can be traced down the pages of history, an offence to society, a curse to the afflicted, epitomized in the Scriptures in the "leper as white as snow." Men afflicted would travel far to seek the aid of the gods as did Naaman, and others would know that their affliction betokened their wrath as did Gehazi.

Few diseases have such marked and constant features. The student meeting psoriasis as a "short case" in his final examination is happy, and the general practitioner makes this one diagnosis with confidence. But to be unable to roll up one's sleeves or wash in public; to shun school, to avoid sport, and not to indulge the joys of a holiday at the coast or a voyage at sea; to leave a trail of silver scale about the house and blood-stains on the sheets and to fear the public gaze—this is a cruel

fate. Let no medical man console himself or think he comforts his patient by telling him that he will not die of psoriasis.

Incidence of Psoriasis in the Population

No one can give an accurate figure of the incidence of psoriasis in the general population, but I have judged that in this country there are no fewer than 500,000, and probably nearer 1,000,000, persons affected—that is, 1% to 2%. Gahan (1943) suggested that at least 1% of the population of New York was psoriatic. In Denmark the figure is estimated at about 2% of the whole population (H. Haxthausen, personal communication), while Szántó (1935) gave 0.26% for Budapest.

It is important to draw psoriasis into the fold of general medicine and to understand its significance in relation to the whole. One purpose of my remarks will be to present psoriasis aetiologically as a disease with two distinct and separate facets. The first shows psoriasis as an adaptation reaction, to use modern jargon, in which the epidermis of the skin is the target organ and the stress derives from climatic environmental factors. This facet of the disease may run its course independently of the second, which shows psoriasis as a constitutional disorder amenable to the constitutional approach. The second purpose of my remarks will be to secure for the psoriatic patient the effective treatment that is too often denied him by our present inadequate hospital facilities.

Psoriasis a Disease Sui Generis

This common and startling disease bristles with problems. Why, among so many scaling diseases of the skin, is the silver scale of psoriasis so distinctive? Why is the livid salmon-red colour of the psoriatic plaque so exactly limited to that site of epidermal change that psoriasis alone among skin diseases can be recognized from afar by reason of its absolute demarcation? Why is it that the elbows, knees, and scalp are so commonly affected? Why often nails but never hair?

We may say that the root of the hair is buried deep and is well protected; that elbows and knees are subject to trauma and the scalp to irritation from scurf. But these answers are no more complete than is the knowledge that light reflected from the air spaces entrapped in the psoriatic scale causes the silver gleam.

Why does psoriasis not affect mucous membranes? The condition has in fact been reported, but its existence remains very doubtful. In my own series of 1,346 patients 7 showed lesions of tongue or mucosa, but in all they were shown by biopsy or otherwise not to be psoriasis. Yet most other reactions of the skin involve the mucous membranes (Schütz, 1898).

A recent American report on ocular psoriasis is misleading, and in my opinion recalls no more than the fortuitous association of such disorders as conjunctivitis and keratitis with psoriasis (Kaldeck, 1953).

Von Hebra, a careful clinician, described psoriasis as a disease of the healthy, and, while modern medicine with its emphasis on the social and psychological could not accept this observation at its face value, yet it is a fact that patients will suffer psoriasis for tens of years and maintain that they have enjoyed perfect health. Unless psoriasis be so extensive as to be almost generalized, there is very little physical disturbance from the psoriasis itself.

There is no analogous condition of any other part or organ of the body that can be related to this common and universal skin disease.

Incidence of Arthritis

A possible exception to that statement may be arthritis. I will not discuss rheumatism in relation to psoriasis, for I believe that term covers a multitude of ills which few escape. The question of arthritis is more vexed. French authors have stressed the association between psoriasis and arthritis and described arthropathic psoriasis. Bazin (1860) separated psoriasis into the arthritic and herpetic or dartrous types but did not rely only on the presence of arthritis. Bourdillon (1888), under Besnier's direction, describing a series of 36 cases, suggested that they were affections occurring alongside one another rather than one causing the other.

The incidence of arthritis in psoriatics is reported by different authorities as between 1% and 7%, though in the Mayo Clinic the figure was 12% to 15% (Brunsting, 1943; O'Leary, 1943). My own figure is 7% in 1,346 cases. This is much higher than in patients suffering from other skin diseases, given as 0.7%, and higher than in the normal population. My youngest patient with psoriasis and arthritis was a girl aged 12 years. The incidence of psoriasis in arthritics is said to be 2% to 3%, which is much higher than in the normal population, given as 0.7%.

There have been important papers in recent years on this subject by physicians, orthopaedic surgeons, radiologists, and dermatologists, but the conclusions drawn have been conflicting (Comroe, 1944; Sherman, 1952; Reiter and Nørholm-Pedersen, 1953).

Romanus (1945), in his admirable statistical review of psoriasis, regarded the association as coincidental, as did Hench *et al.* (1938). Others, as Sterne and Schneider (1953), however, state that the figures recorded are statistically significant and that the relationship is not fortuitous. I am told that rheumatoid arthritis is practically unknown in Africans in Uganda, Kenya, and Tanganyika, where the same is true of psoriasis. There is no doubt that the incidence varies considerably in different climates.

Emphasis is placed by many on the destructive character of the arthritis, especially as it affects the terminal phalangeal joints; but in fact all types of arthritis are seen in these patients, and similar joint changes are seen in those not suffering from psoriasis. Nevertheless it would seem certain that there is some relationship between these two diseases, if only in the sense that environmental factors responsible for the psoriatic reaction may be an important component in the aetiology of arthritis.

Arthritis apart, psoriasis is essentially a cutaneous affection and does not involve other organs. Neither does it affect animals so far as I am able to learn, though Selye (1950) described a reaction as being psoriatic in one of his experimental animals used in hormonal tests.

Histological Features

The histological changes in the epidermis are striking. There is hyperplasia, with impaired keratinization and some budding down of epidermal pegs (Burks and Montgomery, 1943). There is attraction into the epidermis of trails of leucocytes which collect as plumes under the horny layer and are shed with the horny layer as dry abscesses (Munro, 1900; Civatte, 1924).

Such authorities as Tilbury Fox, Jamieson, Munro, Montgomery, Gans, and Haxthausen see evidence favouring an epidermal source for the disease, while others, as von Hebra and Sabouraud, have favoured a dermal source of the reaction. Civatte, whose work in this field is classical, suggests that the histological findings can be used to support either a primary dermal or epidermal origin for the disease, but, taken in conjunction with clinical features, I suggest that the weight of evidence is in support of the epidermis, the dermal changes being of secondary significance. That does not deny the possibility of the stimulus provoking the epidermal changes arriving upon

occasion by way of the blood stream or nervous system. Madden (1941) claimed to have shown dermal changes in skin unaffected by psoriasis, but this is not really relevant to the question whether the essential lesion of psoriasis is epidermal or dermal.

Geographical and Racial Distribution

It is interesting to consider such figures as exist regarding the incidence of psoriasis in different countries. My own figures concern only those patients seen by me in private practice in the past twenty-five years, and are therefore entirely personal. The total is 1,346, which is 6% of all patients seen. This is almost the same as the incidence in the hospital clinic—5.5% from 1928 to 1938 (Hellier, 1940). Of my patients, 41% were males and 59% females, a proportion of two males to three females. These figures are similar to those published in this country in the past (Radcliffe Crocker, 1903) and to the present figures given me by colleagues in Copenhagen, Stockholm, and Oslo. Figures quoted by Romanus (1945) for other European countries are generally lower, and for the United States of America are in the region of 2% to 4% of all skin diseases, psoriasis being many times more common there in whites than in blacks. Figures for warmer climates are considerably lower, mostly in fractions of 1%.

Jews are said to be more susceptible than others, and Tas (1947), reporting on psoriasis in Israel, found the incidence seven times as great in Jews from Europe as in Oriental Jews.

Many colleagues in Kenya, Uganda, and Tanganyika, including my late chief Sequeira, have assured me of the rarity of the disease in those parts. Lewis (1942) and Gelfand (1947) confirm this, and the latter quotes Morrison as finding psoriasis in the negro easy to treat. The disease is less common in the yellow-skinned than in the white and is rare in the full-blooded negro. Very variable but lower figures are given from India, where the Parsee is said to be more susceptible than the Hindu or Mohammedan (Gans, 1952). There are no figures available for Australia or South Africa. However, psoriasis is reported as common among the aborigines of Central Australia (Cleland, 1928), whereas in an eight-year survey of skin diseases among North American Indians Lain (1913) saw no psoriasis.

Generally it would seem true that the inhabitants of warm climates are less subject to psoriasis, and in temperate climates the majority are better in the summer season and respond favourably to exposure to sun, warmth, and air at the seaside on holiday or abroad. The face and exposed parts which usually escape may be affected in industrial areas, which get less sunlight than other areas.

While this is true, there are exceptions, and in 1% of my series the patients longed for the cold and were comfortable and sometimes clear only from December to March. It is not difficult to imagine that humid heat may be a major source of stress upon the skin of some patients—the seborrhoeic and those subject to prickly heat, for instance—and such stress might well aggravate psoriasis. Rarely, actinic light provokes psoriasis.

In the Eskimo, P. V. Marcussen (personal communication), in a survey of 1,100 Greenlanders in the south, saw no psoriasis, though he emphasizes the difficulties of examination and the bad light. His survey was primarily into venereal disease. Bertelsen (1940) quotes Kiaer (1912) as mentioning one case, an adolescent girl, but as not having previously seen the condition in Greenland. Ehrström in his monograph, *Medical Investigations in North Greenland* (1948–9), does not mention psoriasis.

On the other hand, Dr. H. Gudmundsson informs me that he is of the opinion that psoriasis is more common in Iceland than in other Scandinavian countries. There the climate is cold but relatively dry. Finsen in 1874 gave the incidence in Iceland as 8%, but total figures were small and scabies was rife (42 psoriatics in 513 cases of skin disease) (Allbutt and Rolleston, 1911). Eskimos, like Red Indians, have very little body hair.

However, incidence given in relation to skin diseases is of limited value because of differences in race, habits, diet, and endemic diseases. It would be profitable for a single team of research workers to conduct surveys in different countries, and this is obviously true not only for psoriasis and skin diseases but for many general medical ills. It is an aspect of clinical research that might yield valuable and fundamental knowledge. It is interesting that geographers are seeking a rational classification of climate based upon the transpiration of plants (Thornthwaite, 1948). It is an indication of the fundamental importance of climate in relation to ectodermal function.

We have, then, a skin disease mostly of covered parts essentially epidermal in character; not involving any other organ; very common in the Caucasian, less common in coloured races, and rare in the negro; and significantly influenced by sunlight, warmth, and exposure.

I am suggesting that psoriasis is basically the expression of disturbed adaptation to climatic factors on the part of the cutaneous epidermis. There is no question of the ability of climatic environmental factors to influence epidermal function, and sunlight, temperature, and humidity are the most important in this regard. Hellier (1940) has shown, from a survey of figures from the department at Leeds over a ten-year period, that the incidence of psoriasis may be related to variation in sunlight hours. Samberger (1930) postulated an inherited epidermal dyscrasia and Van Kerckhoff (1930) a light deficiency aspect to psoriasis.

It is a little unnatural to regard the epidermis separately from the dermis or from the organism as a whole, but there is clearly some justification for doing so, and this might explain some of the independence in the behaviour of psoriasis which marks it off from so many other diseases of the skin and allows it to pursue its course often without interference with the general health of the patient.

We recognize that other influences have a specific action on the epidermis. This is true of the smallpox and the wart virus; of drugs, as arsenic and gold; of androgenic hormones at puberty and in A.C.T.H. therapy; and of vitamins, especially vitamin A. It is more than probable that mental factors can affect epidermal function, for there is a very intimate relationship between the epidermis and the central nervous system. If this conception is true it is of importance in treatment.

Psoriasis a Constitutional Disease

I wish now to leave this aspect of the aetiology of psoriasis and to turn to psoriasis as an expression of constitutional disturbance. It must be accepted—indeed, the evidence is overwhelming—that, whatever else may be significant, constitutional disturbances play a major part in the behaviour of psoriasis in many patients.

Inheritance

In the first place we may accept that there is a genetical component in the aetiology of psoriasis. Romanus (1945), in his careful statistical review of over 1,400 patients, 768 of whom were observed over thirty years, postulates a modified dominant inheritance. A positive family history in the region of 30% is usually recorded, and in my series is 33.9%, but for obvious reasons this figure is of little value. Relatives do not broadcast the fact that they have psoriasis, and most of us have converted a negative family history to a positive one by examining a relative accompanying the patient. Families are often restricted because of psoriasis, and we have all known parents who have developed the disease many years after the child.

Such family trees as those here illustrated, for which I am indebted to Dr. Sneddon, are common and significant, but much work remains to be done in this field, correlating the incidence in each generation with the incidence of

psoriasis in the population as a whole (Fig. 1). Four patients in my series of 1,346 had a twin, but in only one case was the twin affected. In eight pairs of dizygous twins Romanus had only one affected.

From his statistics Romanus gives an indication of the risk of psoriasis arising in his own series. The risk of a

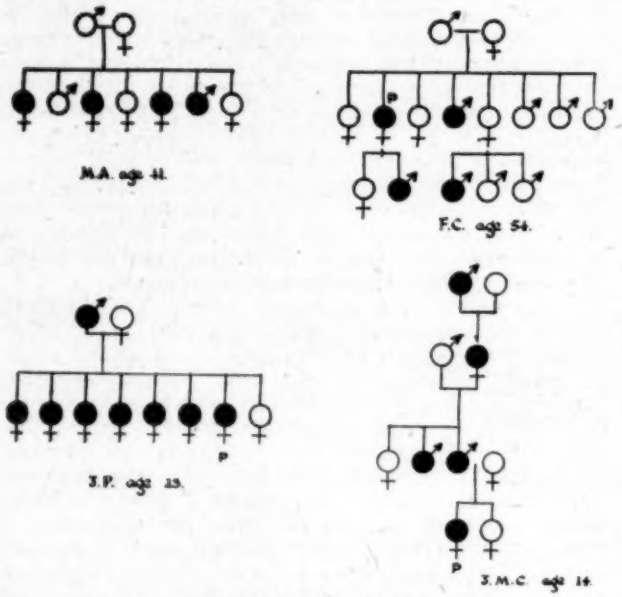

FIG. 1.—Family histories of psoriasis.

child developing psoriasis before the age of 30 if one parent had psoriasis was about 13% if the grandparents were free and 19% if one grandparent was affected. If the person with psoriasis already had a child suffering from the disease the risk of a subsequent child developing it was about 20%. If two persons not suffering from psoriasis had a child with psoriasis the risk of subsequent children contracting psoriasis was less than 1%.

Age of Onset—Hormonal Influence

Apart from heredity, the age of onset of psoriasis suggests that hormonal activity plays an important part.

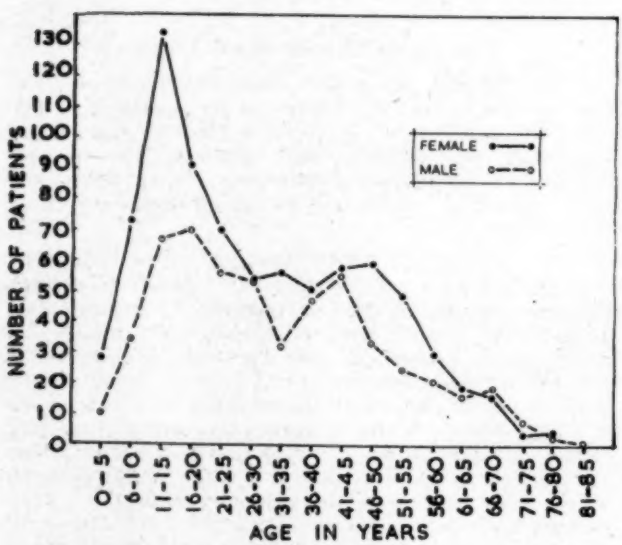

FIG. 2.—Onset of psoriasis.

There is a considerable peak both in males and in females during the pubertal years and another minor peak at the climacteric, after which there is a rapid decline (Fig. 2). Frequently the onset is with the menarche or the menopause, and there is no other obvious precipitating factor. The influence of pregnancy is pronounced, and generally it clears the eruption temporarily (Grüneberg, 1952). Petrini (1912) reported on a patient whose psoriasis cleared during each of her five pregnancies. The original onset of psoriasis may be after confinement, and it is common for psoriasis to be worse after confinement in those subject to the disease, but in some patients pregnancy will terminate a long history of psoriasis.

It is interesting to recall the emphasis placed on the amelioration of rheumatoid arthritis by pregnancy when cortisone and A.C.T.H. therapies were being developed. The same amelioration is common in psoriasis, but we can perhaps see it in better perspective in considering the skin disease. A.C.T.H. and cortisone are of very limited value in this disease. The climacteric peak is more marked in the male than in the female, and this may be related to the fact that the female is subject to regular excursions of hormonal activity throughout the active sexual life.

In 20 of my patients (1.5%) the onset of psoriasis was before the age of 5 years. In one patient it was at 8 months and in another at 9 months, only one of the two having a positive family history. In a very few patients the onset was after 70 years of age, in "the lean and slipper'd pantaloon."

Acute and Chronic Infections

Another precipitating factor may be acute infection, especially the infectious fevers and upper respiratory tract infections such as tonsillitis. It is more common in the young, and the pattern of the psoriasis is a widespread, often peripheral, guttate eruption appearing about ten days after the onset of the infection. It may well be that chronic infective foci maintain a chronic eruption, and this seems sometimes to be the case.

Emotional Stress

Perhaps the most potent influence, however, is the psychological, and much that is undoubtedly true has been written on this by Wittkower (1946) and others. A careful review of the social and psychological background of 80 of my patients in the last seven years has made this abundantly clear to me. It is equally certain, however, that no one type of personality or any single pattern of emotional conflict determines the psoriatic reaction.

Space does not permit the recital of numerous instances of emotional provocation of psoriasis in this series, but I may mention one woman whose psoriasis started from an injury to her thigh from a fall of cliff which at the same time killed her husband by her side.

The burden of psoriasis to society and to the patient who is the victim is obvious. Perhaps the most important aspect of this side of the problem is the attitude of the doctor. If psoriasis is effectively treated and cured soon after it appears it will make no more impression on the patient, his mind and skin, than will the exanthem of measles, and nothing can be more favourable to prognosis than that. Unfortunately there is a tendency sometimes to impress upon the patient the incurability and hopelessness of his disease. This is a grave misdemeanour and to be condemned.

One other important psychological aspect is the sense of shame which the patient and the public may entertain about psoriasis. It is important to dispel this and to let it be known that psoriasis is a common affection of which the patient should be no more ashamed than of acne or baldness.

Mixed Psoriatic and Eczematous Eruptions

Many other constitutional forces may play upon the tendency to psoriasis, but those mentioned are some of the more obvious. I wish now briefly to refer to the existence of other skin reactions occurring with psoriasis, sometimes independently, sometimes combined in the same lesion. These are particularly eczema of either the

catarrhal or the lichenoid pattern; pompholyx, especially of the persistent pustular type; seborrhoeic reactions, usually combining to give a flexural psoriatic eruption; and lichen planus. The knowledge that these combined reactions occur makes their recognition relatively easy, but without that knowledge errors in diagnosis are common. Most of these patterns occur in the later age groups at or after the climacteric, and they are almost invariably very resistant to treatment.

Ordinary catarrhal eczematization may coexist with the psoriasis, and is particularly seen in the sulcus behind each ear and in other flexures, particularly in women at the climacteric. In some patients separate lesions of psoriasis and of eczema may present at the same time or at different times. A number of my patients had eczema from infancy and psoriasis later; others had seborrhoeic eczema at one time and psoriasis at another. The most common change, however, is from lichen simplex at one time in life to psoriasis at another or vice versa, the same sites often being affected.

Lichenoid psoriasis usually affects the flexures and those sites involved in lichen simplex. Alcohol particularly seems to be a poison in these cases. A peculiarly intractable type of lichenoid psoriasis is that which affects the hand or foot like a glove or sock. I have seen good responses to A.C.T.H. and cortisone in such cases, though these measures are of very uncertain value in simple psoriasis.

So-called pustular psoriasis, which Barber and I described in 1930, is probably a mixed eczematous or pompholyx reaction with psoriasis, the catarrhal element converting the dry abscesses of Munro into flat lakes of sterile pus. It may be a temporary phase in ordinary psoriasis and may occur on any part of the body, though the palms and soles are the sites of election. The phase may be provoked by an acute illness or may accompany chronic sepsis. In many patients, however, there is no such cause, and many such eruptions appear to be constitutional in origin. In my experience septic foci are not present in more than 30%, and, in these, treatment of the sepsis, though it may be followed by temporary cure, is rarely a permanent solution of the problem. The condition may occur without ordinary psoriasis, and in my series of 109 cases of pustular psoriasis 33 were associated with or followed by ordinary psoriasis, and only these 33 have been included in my figures.

Pustular psoriasis sometimes alternates or is associated with that markedly scaling form of psoriasis called rupioid psoriasis. Both forms are seen in association with infection, including gonococcal and non-specific urethral infection and infection of the bowel. Holsti (1948) reported some 300 to 400 cases under the title of Reiter's disease in an epidemic of bacillary (Flexner) dysentery in Finland which affected a quarter of a million of the population.

I will mention, without elaboration, that other pustular reactions occur or sometimes alternate with the psoriasis, including vegetating lesions and impetiginous lesions of the rare impetigo herpetiformis type. Though not sterile and giving pyogenic cocci on culture, long observation of such cases and the response to treatment have made me regard them as being essentially mixed psoriatic reactions.

Seborrhoeic psoriasis, more common in females, is a mixed reaction of psoriasis and seborrhoeic dermatitis, largely flexural and often a climacteric affection. It is not as resistant to treatment as the other mixed reactions.

Finally, psoriasis may give place to generalized exfoliative dermatitis. Goeckerman and O'Leary (1932) give an incidence of 1 in 1,000 for this in 22,000 patients with psoriasis. My own figures are higher, 13 cases, or 1 in 100, having at some time shown a complete or almost complete generalized affection, sometimes of transient character, sometimes persistent and resistant, but usually recognizable as psoriasis. The difference in these figures is probably to be explained by the criteria adopted, for psoriasis may assume this phase without entirely covering the skin surface. I assume that in the Mayo Clinic figures involvement of the whole skin was accepted as the criterion.

Treatment of Psoriasis

The treatment and general management of psoriasis call for two distinct lines of approach.

First, on the constitutional side there is the assessment of the individual, the considerations of his health and constitution and of their adjustment to his environment. This I will not elaborate, but it is important and makes each problem of psoriasis an individual one, often demanding a short-term and a long-term policy. It is common to all constitutional disorders.

There remains the treatment of the psoriasis itself. I do not propose to dwell on all possible local treatments for psoriasis, but I would indicate briefly the features of one line of treatment which, with proper facilities, may be expected to clear the eruption of psoriasis in two to three weeks in all but a few patients. It is important that psoriatic patients should know that this can be done, and I feel that it is incumbent upon our medical services to provide this treatment for the large number of psoriatics in our midst, for the treatment cannot usually be conducted in the home.

I have discussed treatment in detail with illustrations in previous papers (Ingram, 1953). The following are the essentials.

The patient soaks for ten minutes in a warm bath containing liq. picis carb. 4 oz. to 20 gallons (114 ml. to 90 litres). After drying, he is exposed to ultra-violet light to produce the slightest erythematous reaction. Each lesion is then obscured with Lassar's paste containing dithranol, 2 gr. in 1 oz. (0.13 g. in 30 g.). The paste must be stiff and the melting-point of the paraffin base should be 46° C. The limbs and trunk are covered with stockinet and the patient assumes his clothes and normal routine until the following day, when the procedure is repeated. This is a stable preparation of dithranol—dioxyanthranol—the synthetic equivalent of the active principle of chrysarobin minus the methyl group. It is a powerful oxidizing agent which becomes active as soon as it comes into contact with the skin and literally burns off the psoriasis. Care must be taken to apply it exactly to the psoriasis and not to normal skin.

There are endless minor modifications of this regime which can be made to suit individual patients and patterns of eruption.

With widespread eruptions of small pattern a soft instead of a stiff paste is applied over the whole affected area and is not localized to lesions. The original dithranol paste is prepared with equal parts of soft paraffin for this purpose. This soft paste is relatively mild in its reaction, and it is used in flexures where reaction to the stiff paste would be fierce.

Paste cannot be applied to the scalp. Here a pomade of mercury and tar, or oil of cade or dithranol or any combination of these, may serve. They will not remain stable in the same application, however, and must be dispensed separately, otherwise the dithranol is rapidly reduced and rendered ineffective.

The treatment demands facilities which should be made available at all hospitals. Baths, lamps, and a competent staff are necessary. In the department at Leeds, which is a busy one with out-patient sessions every morning and afternoon of the working week, some 50 to 60 psoriasis patients are treated daily in addition to the out-patient routine.

For many patients an exposure to ultra-violet light after the daily bath as part of the toilet routine is a valuable and simple maintenance treatment reducing the tendency to recurrence. There are, of course, on the constitutional side many other possible requirements in regard to maintenance therapy, varying with each individual but important in prognosis.

Prognosis

It is clear from clinical experience, and it has been confirmed by statistics, that the prognosis in patients treated effectively within a year of the onset of the disease is very much better than in other patients. Romanus (1945) found that 20% of patients treated at the time of onset of the disease remained clear for twenty years or more, whereas no more than 8% remained clear for such period if treatment was delayed until twelve months after the onset of the psoriasis. I would urge treatment within a few weeks of the onset, and the whole eruption must be cleared. Malcolm Morris (1902) pointed out that "the best security against relapse is the completest possible removal of all remnants of the disease."

It might be expected that the onset of psoriasis in very early childhood was of bad prognostic significance, but this is not supported by evidence from my figures.

As to prognosis generally, some 10% to 25% (Romanus, 1945; Hallam, 1934) are found to clear for very long periods, if not for life. One of my patients who suffered from psoriasis at the age of 14 years was subsequently clear until the age of 70, when he had a second attack.

The majority of patients suffer recurrent attacks at variable intervals, sometimes of months, sometimes of years. A small minority are persistent chronic sufferers in spite of treatment. And these have not been significantly helped by A.C.T.H. or cortisone treatment.

I have mentioned certain mixed types of psoriasis that are particularly resistant. Psoriasis tends to be resistant also in the ginger-haired, the arthritic and gouty, and the alcoholic.

The chronic sufferers from psoriasis, whether they be recurrent or persistent sufferers, tend to improve after the climacteric. In the main psoriasis seems to be an affair of the active sexual hormonal phase of life.

Abandoned Theories

I have emphasized the two factors of epidermal adaptation and of constitutional disturbance in the aetiology of psoriasis and would choose not to confuse the issue by introducing other unlikely theories.

The concept of infection has long been abandoned, though from time to time suspicious cases are recorded. In four of my patients the partner was affected, two of them after marriage. One patient relapsed with psoriasis when his wife was two months pregnant with her second child, at which time she also developed psoriasis for the first time. Both recovered, but after five years the husband has recently suffered another attack, which cleared in ten days with treatment.

Destôt inoculated himself with a plaque of psoriasis and subsequently developed the disease in the usual sites but not at the site of inoculation (Destôt and Angequeur, 1889). He had four further attacks in the subsequent two years. There is also a report by Unna of the three charges of a psoriatic nursemaid contracting psoriasis. Some still adhere to the probability of a parasitic or infective cause, but it has been rejected by most authorities (Schamberg, 1909).

Gans (1952) has reviewed the evidence put forward to support a metabolic aetiology, that of Grütz and Bürger (1933) suggesting a disturbance of lipoid metabolism being the most popular. Gans finds no evidence to support these views, and that is the general consensus of opinion. This does not mean that further investigation along biomolecular or chemical lines may not indicate the part played by particular metabolites in the mechanism of the psoriatic reaction in the epidermis itself; and such knowledge might revolutionize the treatment, local or general, of this disease.

Gans stresses the lowered metabolism, increased acidity, and increase in oxidase in psoriatic patches, and this is interesting since our most effective local treatment involves the use of oxidizing agents.

Summary

As to the significance of psoriasis, I have suggested that for its proper understanding a different approach to its aetiology from that relating to most diseases and reactions is necessary, and have stressed the importance of climate and race.

As regards prognosis, I believe that some discovery relating to the mechanism of the reaction in the skin may well revolutionize treatment. Even so, I believe that, with the measures at present at our disposal, the life of the psoriatic patient could be largely transformed if facilities were made available for the proper use of those measures.

If there are any truths in the concept I have presented of the nature of psoriasis, a common skin disease, they must be truths which have an application in some important fields of general medicine. If there is any serious need for the pattern of medical treatment I have outlined for psoriasis, it is a pattern, you will agree, that is necessary in fields other than the dermatological.

I do indeed suggest that there is much important clinical research to be done into the place of climate and geographical location and of race in relation to disease which may throw light on some of our obscure problems. As on other occasions, the skin may be of service to general medicine in this regard.

We may hope that one day international relations will reach that Utopian phase when those afflicted by disease may seek their fortunes in climates which are judged to provide the most favourable environment.

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BACTERIAL RESISTANCE TO ISONIAZID AND "MARSILID" IN TREATMENT OF PULMONARY TUBERCULOSIS

RESULTS OF TRIALS

BY

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Bacteriological and clinical resistance appears in a high proportion of patients with pulmonary tuberculosis treated with isoniazid alone (Medical Research Council, 1952; Joiner *et al.*, 1952). The value of daily injections of streptomycin in preventing resistance to isoniazid has been amply demonstrated (Medical Research Council, 1953a), but streptomycin given in doses of 1 g. twice weekly is less effective for this purpose (United States Public Health Service, 1953; Medical Research Council, 1953b). The incidence of resistance to "marsilid" (1-isonicotinyl-2-isopropyl hydrazine) is not known, since this drug is not yet available for general use. Nash and Grosfeld (1952) recovered resistant strains from three of four patients treated with marsilid for six weeks. Robitzek *et al.* (1953), on the other hand, found resistant strains in only one of 14 patients treated for an average period of 112 days.

The purpose of the present paper is to report the results of sputum-sensitivity tests carried out before, during, and after treatment with isoniazid and marsilid (alone, and in combination with streptomycin).

Laboratory Methods

1. *Isoniazid Sensitivity Tests.*—The specimen of sputum under investigation was first concentrated and inoculated on to a plain Löwenstein–Jensen slope. Löwenstein–Jensen slopes containing concentrations of 0.2, 1, 5, and 50 μg. of isoniazid per ml. and a plain control were then inoculated from the resulting culture by the following method. A platinum loop (slightly opened and therefore incapable of taking up a loopful of fluid) was rubbed over some 2 square cm. or more of medium until the growth was broken up, large masses being pushed aside. After resterilization in boiling water and flame, the loop was then rubbed over the clear area before the inoculation of each tube. The slopes were incubated at 37° C. for 21 days. Resistance was recorded when there was growth on any of the slopes containing isoniazid, but a growth of fewer than 10 colonies on the 0.2-μg. slope was disregarded. (A growth of fewer than 10 colonies in the higher concentrations occurred in five cases; these are discussed below.) Sensitivity was recorded when no growth occurred on any of the isoniazid slopes after 21 days' incubation, provided that there was then a free growth in the control.

2. *Marsilid Sensitivity.*—The same technique was used with Löwenstein–Jensen slopes containing marsilid instead of isoniazid. Resistance was recorded when growth occurred on the slopes containing 5 or 50 μg. per ml. (See discussion.)

3. Streptomycin sensitivity was tested by the above technique, using Löwenstein–Jensen slopes containing 3 and 30 μg. of streptomycin per ml. and a plain control. Resistance was recorded when there was growth on either of the drug slopes, fewer than 10 colonies on the 3-μg. slope being disregarded.

Laboratory Results

Using the method described above, more than 500 tests for isoniazid sensitivity have now been carried out at the London Hospital. Of 125 cultures tested for isoniazid sensitivity before treatment with this drug, 118 were sensitive to a concentration of 0.2 μg. per ml. Strains resistant to 0.2 μg. per ml. (but sensitive to higher concentrations) were recovered from seven patients (5.6%), but in each case growth was less than that on the control; four have subsequently yielded strains inhibited in the 0.2 μg. medium despite two to three months' treatment with isoniazid. This incidence of "doubtfully" resistant strains in pre-treatment cultures accords closely with the findings of the Medical Research Council (1953a), who reported growth in the 0.2-μg. medium in 10 of 180 (5.5%) pre-treatment cultures.

Steenken and Wolinsky (1952) have shown that the minimal concentration of marsilid required to inhibit the H37Rv strain of *Mycobacterium tuberculosis* (1.6–3.1 μg. per ml.) is about sixty times greater than the equivalent concentration of isoniazid (0.02–0.05 μg. per ml.), but considerable variation occurred according to the type of medium used. We have found that the H37Rv strain will grow on Löwenstein–Jensen slopes containing marsilid in concentrations of 0.2 and 1 μg. per ml., but growth is inhibited on the slopes containing 5 and 50 μg. per ml. Cultures from 25 patients have been tested simultaneously for marsilid and isoniazid sensitivity after treatment with one of these drugs. Eleven of these were resistant to isoniazid—four after treatment with marsilid and seven after treatment with isoniazid. The cultures resistant to 0.2 μg. of isoniazid were also resistant to 5 μg. of marsilid, and those resistant to 1 μg. (or higher concentrations) of isoniazid were also resistant to 50 μg. of marsilid. The 13 cultures sensitive to 0.2 μg. of isoniazid were also sensitive to 5 μg. of marsilid. We have therefore concluded that there is cross-resistance between marsilid and isoniazid and that neither of these drugs is likely to have a significant inhibitory effect upon strains resistant to the other. For practical purposes, therefore, the standard isoniazid media should be satisfactory for the testing of marsilid sensitivity.

Of 117 cultures tested for streptomycin sensitivity before treatment with this drug, 114 were sensitive to 3 μg. per ml. Strains of bacilli resistant to 3 μg. but sensitive to 30 μg. were recovered from the other three patients. Further cultures were obtained from two of these patients after streptomycin had been given for three months, and both were then sensitive to 3 μg. per ml. The Medical Research Council (1953a) found that 4 out of 279 pre-treatment cultures were resistant to streptomycin.

Clinical Trial

The clinical and bacteriological manifestations of drug resistance may be so dramatic that the inadequacy of certain regimes of chemotherapy can be disclosed in quite small groups of patients. This was well shown by Joiner *et al.* (1952) in their trials with isoniazid alone and in combination with streptomycin.

At the London Hospital, strong clinical evidence of isoniazid resistance was found in a large proportion of patients treated with this drug alone between March and June, 1952 (Bartley, 1952). It was then decided that large groups of patients should not be committed to any one regime of chemotherapy until the incidence of bacterial resistance with that particular regime had been assessed in a small "pilot" group. Trials on a larger scale could then be undertaken in those groups showing a low incidence of resistance. With this object in view, four groups of patients with pulmonary tuberculosis have now been treated at the

London Hospital according to the following regimes of chemotherapy:

Group I (10 patients): isoniazid, 300 mg. daily, + streptomycin, 1 g. twice weekly.
Group II (9 patients): marsilid, 300 mg. daily.
Group III (17 patients): marsilid, 300 mg. daily, + streptomycin, 1 g. three times weekly.
Group IV (10 patients): isoniazid, 300 mg. daily, + streptomycin, 1 g. three times weekly.

The criteria required for admission to one of these four groups were: (1) that the patient should not previously have had isoniazid or marsilid; (2) that tubercle bacilli should have been recovered from a specimen of sputum collected within one week of the start of treatment; and (3) that the pre-treatment culture should not grow in a concentration of 0.2 μg. of isoniazid per ml. or 3 μg. of streptomycin per ml.

All cases of pulmonary tuberculosis regarded as suitable for chemotherapy and also fulfilling the above criteria were allotted to one of the treatment groups according to the following scheme: from August to December, 1952, patients were allotted alternately to Groups I and II. In December, 1952, it was realized that a high incidence of resistance was occurring in Groups I and II. Both these groups were therefore withdrawn, and from January to October, 1953, patients were allotted alternately to Groups III and IV. More recently Group IV proved unsatisfactory and was also withdrawn, subsequent cases being allotted to Group III.

In each group the prescribed regime of chemotherapy was given for 100 days. Treatment was interrupted only if withdrawal of a drug was necessary because of toxic reactions, but in no case was a drug withheld for more than three days. Bacterial sensitivity to isoniazid (or marsilid) and to streptomycin was tested immediately before and after the course of treatment and also at monthly intervals during treatment. The final sensitivity of the organisms after treatment was confirmed in at least two separate specimens of sputum.

The results of these isoniazid (and marsilid) sensitivity tests are shown in Table I. Streptomycin-resistant strains were not recovered from patients in any of the four treatment groups.

TABLE I.—*Development of Resistance to Isoniazid (and Marsilid) in Four Treatment Groups*

Group	Total No. of Cases	1 Month		2 Months		3 Months		After Treatment (100 Days)	
		S	R	S	R	S	R	S	R
I	10	10	0	8	0	7	0	1	3
II	9	6	0	4	3	0	5	0	6
III	17	13	0	12	0	9	0	7	0
IV	10	6	0	6	0	2	2	1	4

The number of positive cultures sensitive (S) and the number resistant (R) to isoniazid (and marsilid) are shown at each stage of treatment.

Comment

It has already been stated that the object of this trial was to determine the incidence of bacterial resistance in small "pilot" treatment groups with a view to large-scale trials of those groups showing a low incidence of resistance. The number of cases in each treatment group is too small to justify any comment upon the relative effect of the different regimes upon clinical progress. The following observations may, however, be made:

(1) Bacterial resistance to marsilid (Group II) develops in a high proportion of cases within two to three months, but the emergence of resistant strains can be postponed by combination with streptomycin (Group III). In this respect, marsilid behaves in similar fashion to isoniazid and should in no circumstances be given alone.

(2) Although bacterial resistance to isoniazid was delayed by combination with 1 g. of streptomycin twice weekly (Group I) or thrice weekly (Group IV), a high incidence of isoniazid-resistant strains were found in the fourth month of treatment in both these groups. Of nine cultures available in the fourth month of treatment, five were resistant to 50 μg. of isoniazid and two to 1 μg. A more extensive trial of these two treatment groups (Groups I and IV) is not considered advisable. Streptomycin-resistant strains were not recovered from cases in either of these groups even when isoniazid resistance had emerged. (It should be noted, however, that in no case was streptomycin given for more than four to five weeks after the appearance of isoniazid-resistant strains.)

(3) As already stated, cases were allotted alternately to Group IV and Group III. These two groups form part of another trial in which isoniazid and marsilid are being compared; the results of this trial will be published at a later date. Although the figures are small, it is of interest that, in the isoniazid group, resistant strains were recovered from four of the five cultures available in the fourth month, whereas in the marsilid group all of the seven cultures available in the fourth month were sensitive. In order to determine whether differences in the type of disease had significantly affected the incidence of resistance in the two groups, the pre-treatment status of the cases with cultures available for sensitivity tests after 100 days' treatment have been compared. Table II shows that there is no gross disparity between the two groups in regard to the duration, type, and extent of the disease. The Medical Research Council (1952) found that isoniazid-resistance developed equally often in each of the three disease groups studied, but a higher incidence of resistance was noted among those patients acutely ill at the start of treatment. This latter factor is unlikely to have affected the results in the present study: at the start of treatment none of the patients was acutely ill and the average level of the blood sedimentation rate was actually higher in the marsilid than in the isoniazid group.

TABLE II.—*Clinical Condition of Patients in Groups III and IV Before Treatment. A Comparison of the Pre-treatment Condition of Patients Yielding Positive Cultures After 100 Days' Treatment with Marsilid and Isoniazid*

	Group III	Group IV
Total No. of patients with positive cultures after 100 days' treatment	7	5
Average age	40 years	45 years
„ „ weight	117 lb. (52 kg.) (average of 18 lb. (8·2 kg.) below normal weight)	132 lb. (59·9 kg.) (average of 14 lb. (6·35 kg.) below normal weight)
Probable duration of disease:		
Less than 6 months	5 cases	4 cases
More „ 12 „	2 „	1 case
Previous treatment in hospital	2 „	1 „
Radiological extent of disease (average number of zones affected)	3·4	4
Cavitation:		
None	1	1
Single	2	1
Multiple	4	3
Large tension cavities	4	3
Fever	2 cases	2 cases
Average blood sedimentation rate	54 mm./hr.	35 mm./hr.

Reversion to Isoniazid Sensitivity

In the Medical Research Council (1953c) trials it was found that of 28 patients with resistant strains at the end of three months' treatment with isoniazid, only one yielded a sensitive strain and two others doubtfully resistant strains three months after the drug was withdrawn. The Medical Research Council Report concluded that over a three-months' period there was no evidence of any general reversion of isoniazid-resistant strains either to a lower level of resistance or to sensitivity.

On the other hand, there is *in vitro* evidence (Pansy *et al.*, 1952; Barnett *et al.*, 1953a) that isoniazid-resistant strains may revert to sensitivity, and this has also been noted in patients after isoniazid treatment is stopped (Nitti, 1952; Knox, 1953; Nigoghossian, 1953).

At the London Hospital 21 patients from whom resistant bacilli were recovered after treatment with isoniazid or marsilid have been observed for periods of four to twelve months after the cessation of treatment. In each case resistance was confirmed in at least two separate specimens

of sputum. The frequency of subsequent tests for sensitivity depended to some extent upon the availability of suitable bacterial cultures; tests were also made more often whenever a change in the level of resistance had been detected. Table III shows that 9 of these 21 resistant cases

TABLE III.—*Changes in Level of Isoniazid Resistance After Cessation of Treatment. (Degree of Resistance is expressed in μg. per ml. of Isoniazid)*

Case No.	At End of Treatment	Months After Treatment Stopped											
		1	2	3	4	5	6	7	8	9	10	11	12
1	50					50					50		50
2	1	1		1	1		1		1		1		
3	50		50						50				
4	5			1		1	1		1	1			
5	5			1			1		1		1		
6	50				5	5		5	50				
7	50					50					50	C	S
8	50			50	50			50		5	C	S	S
9	50				50	5	5						
10	50					50							
11	5				1	1		1				1	
12	50			50	S		50	50		S	S	S	
13	50			S	S	C	S	S					
14	1				0·2								
15	50				S		S						
16	5		1	0·2	S			S	S	S	S		
17	50	S	50	S	S	S	S	S					
18	50				S	50		S	S		S		
19	1							C	S				
20	5										0·2		
21	50							1					

S=Sensitive to a concentration of 0·2 μg. per ml. of isoniazid.
C=Growth of fewer than 10 colonies in two or more of the four drug concentrations.

(44.4%) have now yielded strains sensitive to 0.2 μg. of isoniazid per ml. (In seven of these, examination of two or more consecutive specimens of sputum has failed to reveal resistant organisms.) Another seven patients have yielded strains of a reduced level of resistance, and in only five cases has the degree of resistance remained unchanged. Six of the nine patients showing reversion to sensitivity yielded their first sensitive strains within four months of the cessation of treatment. In one case (No. 17) sensitive strains were recovered in the first month, and two patients (Cases 8 and 7), who had yielded highly resistant strains until the tenth month, produced sensitive strains in the eleventh and twelfth months respectively. Three patients (Cases 12, 17, and 18) produced strains of varying sensitivity before a consecutive series of sensitive cultures was obtained.

Since resistance to isoniazid can now be prevented in most cases by combination of the drug with streptomycin, a clinical evaluation of the factors affecting reversion to sensitivity must necessarily be retrospective and involve comparatively small numbers of cases. In the present study, four possible factors have been considered:

(1) *Original Level of Resistance.*—The rate of reversion is apparently unrelated to the original level of resistance. Cultures from one patient (Case 2) have remained consistently resistant to a concentration of 1 μg. of isoniazid per ml. for ten months, and cultures from another three patients (Cases 4, 5, and 11), which were resistant to 5 μg. per ml. at the end of treatment, were still resistant to 1 μg. per ml. more than nine months later. On the other hand, cultures from eight patients which were originally resistant to 50 μg. per ml. have now become sensitive to 0.2 μg. per ml., three of these within four months of the cessation of treatment.

(2) *Form of Administration of Drugs.*—Reversion to sensitivity occurred whether the patients were originally treated with marsilid (three reversions) or isoniazid (six reversions). Four patients rendered resistant to isoniazid when it was combined with either P.A.S. (three cases) or streptomycin, 1 g. twice weekly (one case), all reverted to sensitivity. (The remainder of the 21 patients in this study had received either marsilid or isoniazid alone.)

(3) *Duration of Drug Treatment.*—The five patients in whom the degree of resistance remained unchanged had all received more than 120 days' treatment (average, 157 days) with either isoniazid or marsilid, 200–300 mg. daily. Seven of the nine patients showing reversion to sensitivity had received less than 100 days' treatment (average, 83 days) with isoniazid or marsilid in the same dosage. It is of interest that the other two patients (duration of treatment, 125 and 128 days respectively) did not yield sensitive strains until more than eleven months after the cessation of treatment. (In order to show these points more clearly, the cases recorded in Table III have been numbered according to the duration of isoniazid treatment: Case 1 had received the longest course, and Case 21 the shortest course.)

(4) *Type of Disease.*—If the 11 patients who remained resistant for more than six months after the cessation of treatment (Group R) are compared with the six who yielded sensitive strains within this period (Group S), certain interesting differences are revealed. In Group R the disease had been diagnosed for more than two years and had failed to respond to previous treatment in hospital in 10 of the 11 cases. Only one patient in Group S had been diagnosed for more than two years and three had received previous hospital treatment. Four or more lung zones were involved in all but three patients in Group R and in only two patients in Group S. Large tension cavities were present in four Group R patients and in none of the Group S patients. Nine of the 11 patients in Group R had more than one cavity as compared with three of the six Group S cases. Differences in the general condition of the patients and the activity of the disease in the two groups at the start of drug treatment were not conspicuous, and all were sputum-positive on direct microscopical examination. The progress of the patients in these two groups may well reflect differences in their status at the start of treatment. All the six patients in Group S have undergone thoracoplasty, five have shown clinical improvement, and three have been discharged from hospital. Four were sputum-negative on direct microscopical examination, but a second course of isoniazid had been given to three of these after reversion to sensitivity was noted. In Group R 4 of the 11 patients have been fit to undergo surgical treatment, four are sputum-negative on direct examination, and only one has been discharged from hospital. Six of the patients still have large cavities and a heavily positive sputum; four have deteriorated clinically and one has died.

It is clear that with such small numbers of cases there must be an appreciable overlap in the operation of the factors which have been considered. For instance, longer courses of isoniazid or marsilid treatment were advised for some of the more advanced cases, and it is not possible to be certain which of these two factors may have delayed reversion to sensitivity. It is apparent, however, that differences between the cases reverting to sensitivity and those remaining resistant do exist and that reversion may be a predictable rather than a fortuitous phenomenon.

Significance of Bacteriological Resistance and Reversion to Sensitivity

It is known that clinical relapse may accompany the emergence of resistant strains during isoniazid therapy. This was certainly noted in a high proportion of cases treated with isoniazid alone at the London Hospital in the spring of 1952 (Bartley, 1952) and in cases treated with marsilid alone in the autumn of the same year (Ogilvie, 1953). This relapse was usually associated with a recurrence of symptoms, a transient fever, an increase in the amount of sputum (sometimes with reversion from negative to positive), and the cessation of radiological improvement. Loss of weight was not a conspicuous feature; in fact, a number of the patients on marsilid continued to gain weight while deteriorating in other respects. When isoniazid is combined with streptomycin or P.A.S. the emergence of isoniazid resistant strains is, in our experience, only rarely accompanied by a detectable clinical relapse. As noted previously, the bacilli may remain sensitive to streptomycin (given two or three times weekly) for some weeks after acquiring resistance to isoniazid, and the former drug may thus continue to control the infection.

It is, on the other hand, quite a common experience to find that a clinical response to isoniazid alone may continue after resistant strains have first been detected in the laboratory. This may imply a combined infection by sensitive and resistant organisms, a possibility which is supported by our own findings. It has already been stated that in three of our cases (Nos. 12, 17, and 18 in Table III) there was a variation in the sensitivity of cultures grown from different specimens of sputum before the appearance of a consecutive series of sensitive cultures. In two of these

three cases (Cases A and B in Table IV) and in two other cases not included in the present series (Cases C and D), a simultaneous variation in sensitivity to isoniazid and streptomycin has been found (see Table IV). Our findings in five other cases (including Cases 7, 8, 13, and 19 in Table III) suggest that a single specimen of sputum may contain a

Table IV.—*Simultaneous Variation in Isoniazid and Streptomycin Sensitivity*

Case	Date	Sensitivity to Streptomycin	Sensitivity to Isoniazid
A	26/3/53	Growth in 3 μg. per ml.	Growth in 50 μg. per ml.
	6/5/53	S	S
	4/6/53	Growth in 3 μg. per ml.	Growth in 50 μg. per ml.
	17/7/53	S	S
	10/8/53	S	S
B	11/2/53	Growth in 30 μg. per ml.	Growth in 50 μg. per ml.
	8/5/53	S	S
	15/7/53	S	S
C	18/8/53	Growth in 3 μg. per ml.	Growth in 0·2 μg. per ml.
	14/9/53	S	S
D	13/4/53	Growth in 3 μg. per ml.	Growth in 0·2 μg. per ml.
	15/8/53	S	S

S = Sensitive to 3 μg. of streptomycin per ml. or 0·2 μg. of isoniazid per ml.

mixture of sensitive and resistant organisms. In each of these cases a small number of colonies of tubercle bacilli were observed in two or more of the four drug concentrations, while a profuse growth occurred on the control medium. (In the Medical Research Council Trials a growth of fewer than 20 colonies on any of the drug media was disregarded. The possible significance of this phenomenon in patients who have previously yielded resistant strains is discussed in paragraph 3 below.)

Certain tentative conclusions may be drawn from these observations:

(1) The examination of a single sample of sputum may not reveal the sensitivity of the prevailing infection, and the recovery of resistant strains would not, therefore, preclude a clinical response to isoniazid.

(2) The variation in sensitivity of cultures grown from consecutive specimens of sputum in three cases suggests that resistant and sensitive foci of infection can exist in different parts of the lung. The result of a sensitivity test may thus depend upon the source of the sputum under examination or the relative access to the bronchi of separate lesions at that particular time. The simultaneous variation in streptomycin and isoniazid sensitivity observed in four cases implies that certain conditions predisposing to the development of resistance within a tuberculous lesion are common to both these drugs.

(3) All of the eight patients showing evidence of a combined infection (five in a single sample of sputum and three in separate samples) had previously yielded highly resistant strains on the cessation of isoniazid treatment, and seven of these have subsequently yielded completely sensitive strains. (The eighth patient has so far been observed for only three months after the withdrawal of isoniazid.) Such evidence of a combined infection has not been found in more than 400 sensitivity tests carried out in the same laboratory before and during isoniazid therapy, nor in those resistant cases which have so far failed to yield sensitive strains. It therefore seems that reversion from a resistant to a predominantly sensitive infection is characterized by sudden changes or by a variability in the sensitivity of the organisms recovered, rather than by a gradual lowering of the degree of their resistance (see Table III). Reversion could thus be explained either by the closure or healing of resistant foci of infection or by the overgrowth of resistant organisms by sensitive mutants. This view would be in keeping with the observation that resistant tubercle bacilli may be less virulent than the sensitive organisms (Mitchison, 1954).

Practical Applications

Two important practical considerations which arise in relation to isoniazid resistance and reversion to sensitivity are: (1) Should isoniazid ever be given to patients who are yielding resistant strains? and (2) Is isoniazid of any significant value in patients who have reverted from a resistant to a predominantly sensitive infection?

It has already been mentioned that a clinical response to isoniazid may continue after the first resistant strains have been recovered in the laboratory. On the other hand, we have had disturbing results from giving marsilid to patients who had consistently yielded resistant organisms since their original course of isoniazid. When marsilid first became available (and before it was known that there was cross-resistance between it and isoniazid), eight patients with known isoniazid-resistant strains were treated with marsilid for periods of one to three months. None of these showed any significant improvement as judged by *x*-ray changes, blood sedimentation rate, or reduction in the amount or infectivity of the sputum. Three of them actually deteriorated during the first month of marsilid therapy with an increasing amount of sputum and a rising blood sedimentation rate. One of the three (whose condition had shown little change during the preceding nine months) became seriously ill in the third week of treatment with a high fever and radiological extension of the disease. Three separate specimens of sputum from this patient were then tested for isoniazid sensitivity, and it was found that the bacilli from each specimen grew more profusely on the isoniazid media than on the control. The heaviest growth was noted in the medium containing the highest concentration of isoniazid (50 μg. per ml.) and the least growth occurred in the drug-free medium. These three patients all improved when marsilid was withdrawn. A fourth patient, whose condition remained unchanged during marsilid therapy, showed some radiological clearing after the drug was withdrawn. Evidence of enhanced growth in the isoniazid media was also noted in this case. (It should be emphasized that the effect of marsilid against sensitive tuberculous infections is of a similar order to that of isoniazid, and a deterioration such as is described above has not been seen among more than 80 sensitive cases treated at the London Hospital.) It has recently been shown that treatment with isoniazid may also increase the virulence of resistant infections in mice (Barnett *et al.*, 1953b) and in guinea-pigs (Mitchison, 1954).

We have as yet little evidence concerning the value of isoniazid in the treatment of patients who have reverted from a resistant to a predominantly sensitive infection. Three of these patients have been given second courses of isoniazid, but the clinical value of the drug was masked by the fact that it was combined with streptomycin and that surgical measures were also adopted. It is of some interest, however, that in each case the bacilli have so far remained sensitive to isoniazid—in two cases after six weeks' treatment, and after four weeks' treatment in the third case.

Summary and Conclusions

Clinical and bacteriological evidence of cross-resistance between isoniazid and its isopropyl derivative (marsilid) is presented: a tuberculous infection resistant to one was invariably found to be resistant to the other.

A slight degree of isoniazid resistance (growth in 0.2 μg. per ml.) was detected in 5.6% of all pre-treatment cultures, but the practical significance of this finding is doubtful. Higher levels of resistance were not found in patients who had not previously received isoniazid.

The results of sensitivity studies in small "pilot" treatment groups of patients with pulmonary tuberculosis are reported. These results indicate that 1 g. of streptomycin given either twice or thrice weekly will not prevent isoniazid resistance over a four-months period, but streptomycin resistance was not observed in either of these two groups. A high incidence of isoniazid (and marsilid) resistance was also noted among patients treated with marsilid alone, but not when this drug was combined with 1 g. of streptomycin three times weekly.

Of 21 patients yielding isoniazid-resistant strains, 9 (44.4%) showed reversion to sensitivity within twelve months of the cessation of treatment. Certain factors which may determine reversion to sensitivity are discussed.

A variability in the sensitivity of different cultures from the same patient and in the clinical response to isoniazid of patients yielding resistant strains is noted. It is suggested that in some cases a combined infection with resistant and sensitive strains may exist and that the examination of a single sample of sputum may not reveal the sensitivity of the prevailing infection.

Certain practical implications of isoniazid resistance and of reversion to sensitivity are discussed. Attention is drawn to the dangers of giving isoniazid or marsilid to patients consistently yielding resistant strains: not only may reversion to sensitivity be delayed, but a dangerous exacerbation of the disease can be induced.

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SURGICAL INDUCTION OF LABOUR IN MODERN OBSTETRIC PRACTICE*

BY

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The risk of infection has ceased to play a dominating part in the management of obstetric cases since chemotherapeutic and antibiotic substances have shown themselves capable of either preventing or controlling this hazard. This had led to the more frequent employment of obstetric procedures which in the past were thought to predispose to the introduction or spread of infection of the genital tract. Caesarean section and manual removal of the placenta have perhaps been the most notable examples of this trend. There can be little argument that the effect, in regard to the employment of these two procedures, has been beneficial for both child and mother. In our own practice during the last few years a similar trend has been noted in our employment of surgical induction of labour by artificial rupture of the membranes. This is a well-tried procedure the effects of which have been the subject of many reports in the last twenty years. A report by Gibson (1952) gives a comprehensive survey of the position up to that time.

The main objections to surgical induction of labour in the past have been the risk of infection to mother and child, especially in cases in which the latent period between induction and the onset of labour was prolonged, prejudice against the subsequent conduct of labour, especially with regard to the employment of caesarean section, and the poor chance of survival of a small child when the clinical estimate of foetal size before induction had been inaccurate. Under modern conditions these objections are, in our opinion, less valid, and consequently artificial rupture of the membranes can be employed in a greater variety of conditions than previously. Apart from cases of hypertensive toxaemia, the object in inducing labour should be to promote easy vaginal delivery of a healthy child of reasonable size without detriment to the mother. In hypertensive toxaemia the induction should be carried out either to remove the child from what is considered to be an unhealthy environment or to prevent advancing toxaemia. It is hoped that frequent employment of induction of labour should result in a low foetal mortality and that, in achieving this, resort to caesarean section should be necessary on as few occasions as possible.

A review of the cases in which surgical induction of labour has been performed during the years 1950, 1951, and 1952 in the maternity units at the County of Lanark Maternity Hospital, Bellshill, and the William Smellie Memorial Hospital, Lanark, was therefore undertaken. These cases have all been under our personal control, and we have been responsible for the policy of induction of labour and subsequent management.

During the years mentioned labour was induced by artificial rupture of the membranes in 1,585 cases. This represents 18.3% of all deliveries in the hospitals during this period. Thirty-one cases of ante-partum haemorrhage have not been included because of the doubt which exists in these cases whether they are already in labour at the time of induction and because of the difficulty of estimating the effect on the foetus.

Method

The usual practice was to puncture the amniotic sac with a male metal catheter or with the type of catheter described by Drew Smythe (1931). Either the forewaters or the hindwaters were punctured, the object being to allow the liquor amnii to drain away. In most cases the membranes were separated from the region of the internal os before the puncture was performed. The patient was then allowed to go into labour. Only in occasional cases in which the latent period was prolonged was medical induction given in addition. It was singularly unsuccessful in our hands, but pituitary extract was very seldom used. No regard has been paid to the condition of the cervix. Once the decision was taken to induce labour the membranes were ruptured whether the cervix was taken up or whether it was closed with a long narrow canal. Similarly no regard was paid to whether the head was fixed or free in taking the decision to induce labour.

Indications.—The main indications for induction are shown in Table I.

*The paper read by Dr. Tennent in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Glasgow, 1954, was based on this work.

Table I

Prolonged pregnancy	633 cases	84·2%
Hypertensive toxaemia	504 "	
Contracted pelvis	121 "	
Large foetus	76 "	
Previous caesarean section	39 "	
Unstable presentation	30 "	
False labour	27 "	
Anencephaly and hydrocephaly	26 "	
Bad obstetric history	21 "	
Oedema	19 "	
Rh iso-immunization	15 "	
Urinary disease	14 "	
Hydramnios	9 "	
* Miscellaneous	51 "	
	1,585	

Results

Maternal Mortality.—There was one maternal death, giving a maternal mortality of 0.06%, or 0.66 per 1,000 live births.

Maternal Morbidity.—A temperature of 100° F. (37.8° C.) or over during the puerperium was noted in 39 cases. In only six of these did the fever persist for a period in excess of three days. Chemotherapy or antibiotic substances were used on 297 occasions. The main indication was for urinary infection in the puerperium, but on occasion they were used prophylactically. No frank case of maternal sepsis occurred.

Foetal Mortality.—Eighty-three infants were lost, giving a gross foetal mortality of 5.3%. When the unavoidable losses were excluded the corrected foetal mortality was 36 (2.3%). The details are shown in Table II.

Table II

Stillbirths			62 (3·9%)
Unavoidable	43		
Abnormalities incompatible with life	26		
Death *in utero* before induction	12		
Rh iso-immunization	5		
Avoidable	19*		
Neonatal deaths			21 (1·4%)
Unavoidable	4		
Congenital abnormalities	3		
Rh iso-immunization	1		
Avoidable	17 (1·1%)		

* Of these 19 stillbirths, 10 were born of a mother suffering from hypertensive toxaemia.

Latent Period.—The efficiency of the method as judged by the length of the latent period is shown in Table III.

Table III

	Primigravidae	Multiparae
In labour within 24 hours	74·8%	72·5%
" " " 72 "	91%	88%
Failures (over 72 hours)	9%	12%

Length of Labour.—Labour lasted over 24 hours in 79 (10.9%) of the primigravidae, and only nine (1.2%) of these were undelivered after 48 hours. Among the multiparae the duration was over 24 hours in 40 cases (4.6%), and in nine (1.0%) of these over 48 hours.

Mode of Delivery.—The modes of delivery are best shown in Table IV.

Table IV

	Primigravidae	Multiparae
Spontaneous	585 (80·6%)	814 (94·8%)
Assistance in second stage	117 (16·1%)	24 (2·8%)
Caesarean section	24 (3·3%)	21 (2·4%)

The caesarean section rate for all cases was 2·9%.

Prolapse of Cord.—This occurred only once, in a case of hypertensive toxaemia. This child was stillborn.

Induction of Labour in Prolongation of Pregnancy

Prolongation of pregnancy was the most common indication for induction of labour in the series. Our object was to prevent dystocia and anticipate the danger of placental insufficiency. This was based on a clinical impression that, where pregnancy had lasted more than 41 weeks, large infants, dystocia, and foetal distress in early labour were common. Considerable support for this impression has come from the work of McKiddie (1949), Walker and Turnbull (1953), and Racker, Burgess, and Manly (1953).

It has been our policy to induce labour by artificial rupture of the membranes in cases in which pregnancy had persisted beyond 287 days, provided there were reasonable grounds to presume that this duration was correct. Therefore the mother had to be able to recall the date of her last menstrual period to within a few days, and we had to assure ourselves that the child was not unduly small. Labour was induced for this indication in 633 cases—288 primigravidae and 345 multiparae. The results are shown in Table V.

Table V

	Primigravidae	Multiparae
Infants		
Stillborn	1	3
Neonatal deaths	2	2
Weight over 8 lb. (3·6 kg.)	82	140
" under 6 lb. (2·7 kg.)	14	11
Latent interval under 24 hours	230	271
" " over 72 "	24	35
Duration of labour under 24 hours	258	334
" " " 24–48 "	25	8
" " " over 48 "	5	3
Mode of delivery		
Spontaneous	242	339
Forceps	42	3
Caesarean section	4	3

Of the eight infants lost, two had abnormalities precluding survival—namely, exomphalos and severe spina bifida. If these are excluded the corrected foetal mortality becomes 0.9%.

The tendency was for the infant to be large: 35.1% of the infants weighed over 8 lb. (3.6 kg.). As would be expected, the method was more efficient in this type of case than in the whole series, 79.1% of cases being in labour within 24 hours. Prolonged labour was infrequent, 93.5% of cases being delivered within 24 hours and labour lasting over 48 hours in only 1.3%. Delivery by forceps was necessary in 7.1% of cases—almost entirely in primigravidae. The caesarean section rate was 1.1%. Foetal distress was noted 20 times in the primigravidae and four times in the multiparae.

Induction of Labour in Hypertensive Toxaemia of Pregnancy

In common with general obstetric practice, hypertensive toxaemia has been a frequent indication for induction of labour and has been carried out in 504 cases—307 primigravidae and 197 multiparae. Our standard of classification for hypertensive toxaemia has been a diastolic blood pressure of 90 mm. Hg or more at complete rest in bed. Advancing and persistent toxaemia have been the main grounds for deciding that induction of labour was necessary. In addition, all cases showing evidence of hypertensive toxaemia at 38 weeks or later have been induced.

Our object has been to avoid the risk of placental insufficiency to the foetus once an adequate degree of maturity had been reached. The work of Walker and Turnbull (1953), Browne and Veall (1953), and Cox and Chalmers (1953) indicates that hypertension and placental insufficiency are closely related.

The results are as follows. Thirty-one infants were either stillborn or died before leaving hospital, giving a foetal mortality of 6.0%. Seven were known to be dead *in utero* before induction was carried out, in two the cause of death was Rh iso-immunization, and one had a foetal abnormality incompatible with life. When these are excluded the corrected foetal mortality becomes 4.1%.

The foetal mortality is strongly influenced by the severity of the toxaemia and the prematurity of the infants. In this series, where induction has been performed before 38 weeks the toxaemia has been of considerable severity. Among the 106 cases induced before 38 weeks the foetal mortality was 15.4%, but in the 398 cases induced after that time it was 3.3%.

The efficiency of the method was similar to that of the whole series, 70.4% of cases being in labour within 24 hours. However, 10.9% were still not in labour after 72 hours; in hypertensive toxaemia this is a great disadvantage, as is shown further on.

Delivery by forceps was necessary in 54 cases (10.5%), 49 of these cases being primigravidae. Eighteen cases (3.5%) were delivered by caesarean section—14 primigravidae and

4 multiparae. The indication was advancing toxaemia in 5 and foetal distress of dystocia in 13. Foetal distress was noted 29 times.

Induction of Labour in Contracted Pelvis

Surgical induction of labour before term as a method of management of contracted pelvis is not favoured by most obstetricians at the present time. There have, however, been some consistent advocates, such as Drew Smythe (1950). The main objections have been the possibility of infection should caesarean section become necessary in labour and the possibility of the production of a small child owing to inaccuracy in the estimation of the size of the foetus at the time of induction. As is shown below, the risk of infection in subsequent caesarean section is not a factor in modern practice, but the risk of the birth of unduly small infants is real. However, by reasonable precautions this risk can be reduced to a minimum.

It has been our objective to secure an easy vaginal delivery of a healthy child of reasonable but not large size. We have therefore selected only cases of minor degree of pelvic contraction for induction. The main type of contraction has been slight flattening at the brim with restriction of the upper part of the cavity as indicated by the loss of the normal sacral curve. The size and shape of the pelvis in these cases was estimated by radiological pelvimetry some time before the 38th week, when examination of the pelvis was made under thiopentone anaesthesia. At the same time the absence of disproportion between the foetal head and pelvis or otherwise was noted. If no disproportion was found, if the child was of reasonable size, and if prospects of easy vaginal delivery were good, surgical induction of labour was carried out. The subsequent management of the case was that of a trial labour. The 38th week was chosen as the time at which the chances of production of unduly small infants by clinical error in estimation of size were most likely to be low. In the early part of the series induction was considered any time after the 37th week, but this led to the birth of a small premature infant which did not survive.

Labour was induced surgically in 121 cases of contracted pelvis—53 primigravidae and 68 multiparae—selected as described above. The results are shown in Table VI.

TABLE VI

	Primigravidae	Multiparae
Infants		
Stillborn	1	0
Neonatal deaths	0	2
Weight over 8 lb. (3·6 kg.)	3	10
„ under 5 lb. (2·3 kg.)	2	3
Latent interval under 24 hours	35	45
„ „ over 72 „	6	8
Duration of labour under 24 hours	46	61
„ „ „ 24–48 „	7	6
„ „ „ over 48 „	0	1
Mode of delivery		
Spontaneous	35	59
Forceps	12	2
Assisted breech	0	1
Caesarean section	6	6

Of the three infants lost, one died of Rh iso-immunization and can be excluded. One child died of prematurity, and this must be directly attributed to the method. The stillbirth could not be explained, but the mother suffered from cardiac disease and was cyanosed throughout labour. The corrected foetal mortality was 1.7%.

Inaccurate estimation of the infants' weight before induction was evident in 18 (14.8%) of cases. This was of considerable importance in five (4.1%), in which the weight was under 5 lb. (2.3 kg.).

The efficiency of the method was slightly less than the average, as would be expected at 38 weeks, only 66.1% being in labour within 24 hours, but the failure rate was similar to that of the whole series. Prolonged labour was infrequent, only one case lasting over 48 hours. Only 14 (11.6%) cases required assistance by the forceps, and 12 of these were primigravidae. The caesarean section rate was 9.9%, the operation being performed in 12 cases, six being primigravidae. Eleven cases had had caesarean section performed in a previous pregnancy; in seven of these vaginal delivery occurred. Foetal distress was noted eight times among the primigravidae and three times among the multiparae.

Large Foetus

In order to prevent dystocia we have used induction of labour to avoid the development of unduly large infants. The estimation of foetal size is notoriously unreliable, being dependent on the clinical impression derived from abdominal palpation. Occasionally the history of previous large infants is of help. Labour was induced for this indication in 76 cases—33 primigravidae and 43 multiparae. Only one infant was lost. Death occurred from pneumonia and atelectasis. The birth weight was 8 lb. 4 oz. (3.7 kg.). The latent interval was short—two hours—and labour lasted only four and a half hours. No infant weighed under 6 lb. (2.7 kg.), and only four weighed under 7 lb. (3.2 kg.). Fifty-five (72.4%) of these infants weighed over 8 lb. (3.6 kg.), 21 of them being over 9 lb. (4.1 kg.).

Prolonged labour was not frequent, only one case lasting over 48 hours.

Delivery was spontaneous in 67 cases, by forceps in seven (9.2%), and by caesarean section in two (2.6%). Foetal distress was noted four times.

Induction of Labour where Caesarean Section had been Performed in a Previous Pregnancy

In cases in which caesarean section had been performed in a previous pregnancy for an indication which did not recur it became our policy to induce labour at 38 weeks. Our object was to bring on labour when the child was on the whole smaller than the average size at term, and thus lessen the strain on the scar. Further, spontaneous rupture of the classical scar is most apt to occur in the last four weeks, and reduction of this period has been an advantage in the few cases in which this type of operation has been performed. Surgical induction of labour was carried out in 39 such cases.

There was one maternal death. This patient was in her fourth pregnancy. The first two pregnancies had resulted in stillbirths at term for which no adequate explanation could be discovered. Her third child was delivered by elective lower uterine segment caesarean section and had survived. The membranes were ruptured in her fourth pregnancy at 38 weeks. Labour began after an interval of 39 hours. After 10½ hours of labour acute foetal distress was noted and lower uterine segment caesarean section was again performed. The child was alive, weighing 8 lb. 13 oz. (4 kg.). The operation was difficult, being complicated by adhesions from the first operation. Paralytic ileus developed and the patient died on the fourth post-operative day despite gastric suction and parenteral fluids.

There was no foetal mortality, all the infants leaving the hospital alive.

The efficiency of the method was less than that of the series, as would be expected where labour is induced before term. Only 61.5% of cases were in labour within 24 hours, while 28.2% were still not in labour after 72 hours. These latter cases at first gave rise to some concern, but this prolonged latent period does not appear to have affected the ultimate results under modern conditions.

Only one child weighed over 8½ lb. (3.8 kg.). Easy vaginal delivery or delivery assisted by forceps at the outlet occurred in 89.8% of cases. It is our practice to deliver by the forceps in such cases when the second stage has been reached, unless this stage is completed with a few pains. Four cases (10.3%) required a further caesarean section.

Five cases (12.8%) had labours lasting over 24 hours, but in only one (2.6%) did labour last over 48 hours.

Other Indications

The remaining indications, as will be seen from Table I, are those of current obstetric practice and require little comment. Rh iso-immunization was regarded as an indication

for induction in the early part of the series only, and this practice has now been abandoned. We have not practised induction either for our own or for the patients' convenience. Perhaps the most lax indication has been "false labour." In certain cases in which a patient had been admitted to hospital at term supposedly in labour, and this has proved not to be so, labour has been induced to avoid psychological upset to the mother. The practice has at least caused no harm.

Throughout the series concern was felt over two questions—namely, the performance of caesarean section after surgical induction had been carried out, and the effect on the mother and child of a latent interval lasting over 72 hours. These two questions have therefore been examined in detail.

Caesarean Section after Artificial Rupture of the Membranes

Forty-five cases were delivered by caesarean section following surgical induction of labour by artificial rupture of the membranes. Twenty-four of these cases were primigravidae and 21 multiparae. The indications for caesarean section were:

	Primigravidae	Multiparae
Foetal distress	10	9
Dystocia	11	8
Advancing toxaemia	2	3
Prolonged latent period	1	1

Dystocia was usually of the type associated with disordered uterine action.

The two cases of so-called prolonged latent period—24 hours in an elderly primigravida and five days in a case in which a caesarean section had been performed in a previous pregnancy—occurred early in the series and might well have been observed for a longer period before deciding upon operation in the latter part of the investigation.

One patient, as has been described previously, died on the fourth post-operative day of paralytic ileus.

There was no case of frank sepsis. Six cases developed a temperature of 100° F. (37.8° C.) or more, but in only two did this persist for more than three days, and no patient was gravely ill.

One infant was stillborn. Induction had been carried out at term on account of toxaemia. Twelve and a half hours ensued before the onset of labour. After a labour lasting 47 hours lower uterine segment caesarean section was carried out on account of prolonged labour with disordered uterine action. The infant could not be resuscitated. The weight was 7 lb. 12 oz. (3.5 kg.).

In seven cases the latent interval lasted over 72 hours. In only one of these cases did a temperature of over 100° F. (37.8° C.) develop, and this persisted for only two days.

Antibiotics were given to 35 of these patients, most often as a prophylactic measure.

Latent Interval Over 72 Hours

A latent interval of over 72 hours between surgical induction and the onset of labour was noted in 166 cases. The periods of delay before the onset of labour were between three and seven days in 131 cases, between 7 and 14 days in 31 cases, and over 14 days in four cases. The longest interval was 43 days. In this case neither mother nor child suffered any upset.

There was no maternal mortality, and no case of frank maternal sepsis was seen. Low-grade pyrexia—that is, temperature not above 100° F. (37.8° C.)—was noted in 79 cases. In one case the temperature rose above 100° F. but subsided within three days. Chemotherapeutic or antibiotic substances were given to 47 cases. While this medication was usually either prophylactic or for urinary infection in the puerperium, it would have the effect of concealing any puerperal infection which resulted from a long interval with the membranes ruptured.

Twelve infants were stillborn and one died before leaving hospital, giving a gross foetal mortality of 7.8%. Four of these infants had gross abnormalities, and when these are excluded the corrected foetal mortality becomes 5.4%. In four cases of hypertensive toxaemia and in one case of prolonged pregnancy foetal death occurred before the onset of labour. The neonatal death was in a child weighing 7 lb. 6 oz. (3.3 kg.). Necropsy showed atelectasis and pneumonia.

The distribution of latent periods over 72 hours according to the indication with the appropriate foetal results are shown in Table VII.

TABLE VII

Indication	No. of Cases	Foetal Results		
		Alive	Stillborn	Neonatal Death
Hypertensive toxaemia	54	48	5	1
Prolongation of pregnancy	59	58	1	—
Contracted pelvis	14	13	1	—
Previous caesarean section	11	11	—	—
Unstable presentation	7	5	2	—
Anencephaly	3	—	3	—
Large foetus	6	6	—	—
Urinary disease	2	2	—	—
False labour	2	2	—	—
Oedema	2	2	—	—
Bad obstetric history	1	1	—	—
Rh iso-immunization	1	1	—	—
Miscellaneous	4	4	—	—
Total	166	153	12	1

Discussion

The object of this review was to discover whether the frequent employment of surgical induction of labour by artificial rupture of the membranes as indicated above was safe and therefore of practical value. The relative efficiency of the method has been well established and is entirely similar in the present series to that previously recorded by one of us (Tennent, 1938). It is not ideal as regards efficiency, and we have used this method of induction for lack of a better.

There is no doubt that in perhaps many of the cases in this series induction of labour could be regarded as unnecessary interference, as a satisfactory maternal and foetal result could have been obtained had the patient been allowed to go into labour spontaneously. The value of the procedure must be judged on the overall results, and as it is in many cases an unnecessary procedure it should therefore be free from maternal risk. There was one maternal death—a rate below that for childbirth in the country as a whole. We feel that this death could be attributed to the performance of a second caesarean section and that the artificial rupture of the membranes was unconnected. Indeed, the case is a strong argument for the avoidance of repeat caesarean sections if this is possible.

The question of maternal infection is difficult to evaluate owing to the use of chemotherapy and antibiotics, but we feel, in the light of the results in this series, that, provided these substances are available, the possibility of infection is not a deterrent factor in considering the use of surgical induction of labour at the present time.

The foetal results must be considered in relation to the various indications.

The avoidance of prolonged pregnancy seems to be an advantage. The results in this series compare favourably with a similar number of cases going into labour spontaneously at term, and are in agreement with the work of Racker, Burgess, and Manly (1953). Obviously, difficult labour, instrumental delivery, and foetal distress have been infrequent.

Induction of labour in hypertensive toxaemia of pregnancy is such a common indication that the results here require little comment, but the foetal mortality after induction at 38 weeks in this series regardless of the degree of toxaemia is satisfactory enough to indicate that there is little reason for prolonging the risk of toxaemia beyond that date.

The results in contracted pelvis are, we feel, encouraging enough for use of the method in minor degrees of contraction. The main difficulty has been the estimation of the

foetal size before induction, error in which caused one neonatal death. A weight of 6 lb. (2.7 kg.) would appear to us to be the objective to give the best results. It may be that cephalometry will be able to help in this matter, and it is intended to explore this field. The foetal results in the other indications are good enough to justify the procedure from that aspect.

The subsequent course of labour and its management following surgical induction by artificial rupture of the membranes come now for consideration. The examination of three factors—the frequency of prolonged labour, the rate of instrumental delivery, and the caesarean section rate—should give a fair indication of the degree of difficulty experienced in the management of labour and delivery. Prolonged labour has been infrequent. Delivery by forceps has not been unduly frequent in any particular group. The caesarean section rate is worthy of more detailed examination. Our indications for caesarean section are liberal. We performed the operation in preference to a difficult vaginal delivery and where foetal distress appeared before easy vaginal delivery could be undertaken. Therefore the caesarean section rate is a fair indication of the occurrence of dystocia. The rate was 1.1% in prolonged pregnancy, 3.5% in hypertensive toxaemia, 9.9% in contracted pelvis, 2.6% in large foetus, 10.3% in previous caesarean section, and 2.9% for the whole series. We feel that this incidence is low in the light of publications giving the incidence of caesarean section, culminating in that of Jeffcoate (1953), in which an incidence of 15% is quoted. We believe that easy vaginal delivery is preferable to caesarean section for both mother and child, and that induction of labour is a good method of attempting to attain this objective. Should the attempt fail, caesarean section can, in our experience, still be safely undertaken.

The main objection to the method would appear to be the high incidence of cases which do not go into labour within 72 hours. This is, so far as we can judge from our series, a disadvantage to the foetus in hypertensive toxaemia and prolonged pregnancy. In these conditions five infants were lost before the onset of labour. It has been suggested by Gibson (1952) that such patients who do not go into labour within 72 hours in these conditions should be delivered by caesarean section. As no warning of foetal danger was evident in our cases such a policy would have involved the performance of 113 caesarean sections, 108 of which would have been unnecessary.

Conclusion

After reviewing this series of cases, we are of the opinion that the frequent use of surgical induction of labour in the conditions indicated above has contributed to a low foetal mortality, without maternal risk. We feel, further, that this has been obtained with a low caesarean section rate. We would make a plea for the more frequent use of surgical induction of labour, in the hope that fewer caesarean sections will be necessary. There is a need for a more efficient method of induction of labour to eliminate the cases with a prolonged latent period with its detrimental effects on the foetus in hypertensive toxaemia and prolonged pregnancy. We are at present supplementing the artificial rupture of the membranes by an intravenous "pitocin" drip where labour has not begun within 48 hours. The work of Carey (1954) and Faris and Kahlenberg (1954) would indicate that some hope that this will improve the efficiency of the method is justified.

Summary

A series of 1,585 cases in which labour was induced by artificial rupture of the membranes is reviewed.

The main indication for induction of labour in the series were hypertensive toxaemia of pregnancy; prolongation of pregnancy—that is, over 41 weeks; minor degrees of contracted pelvis; excessive growth of the foetus; and previous caesarean section.

There was only one maternal death—a rate of 0.66 per 1,000 live births. The corrected foetal mortality was 2.3%. The caesarean section rate was 2.9%.

The results according to the indication for induction in the various groups of cases are discussed.

A plea is made for the more frequent use of surgical induction of labour by artificial rupture of the membranes in the hope of reducing the number of caesarean sections performed.

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THE MANAGEMENT OF LABOUR IN CONTRACTED PELVIS*

BY

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It is singularly appropriate that the British Medical Association, on the occasion of its visit to Glasgow, should discuss the management of labour in contracted pelvis, because, ever since records have been kept in hospital, Glasgow has enjoyed the odious distinction of having the highest incidence of pelvic contraction in the United Kingdom.

Fifty years ago, in 1903, the incidence of contracted pelvis in the Glasgow Royal Maternity Hospital amounted to 27% of the admissions. Twenty-five years ago, in 1928, 9% of the admissions to the same hospital had contracted pelvis, and to-day the figure has fallen to 4%. Along with the lowered incidence there has been a corresponding improvement in the degree of pelvic contraction. In the early years the degree of contraction was so great that the patients could only be described as being deformed rachitic dwarfs. Even twenty-five years ago the degree of pelvic contraction was often extreme. In the past twenty-five years, however, there has been a noticeable and marked improvement in the degree of contraction. None the less, the cases of contracted pelvis which occur and with which we are concerned to-day are classified as such by generally recognized standards. In no case, for instance, was the true conjugate diameter at the brim more than 10 cm. Where it was as high as 10 cm. there was always other evidence of pelvic contraction, either in the cavity or at the outlet, before it was regarded as contracted.

Although the grosser manifestations of rickets are now a comparative rarity, I am personally convinced that nutritional and environmental factors are still responsible for the high incidence of the milder forms of pelvic contraction which exist in this region to-day, and that faulty

* Read in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association, Glasgow, 1954.

or impaired bony development, whether as a result of true rickets or of some allied deficiency state, is responsible for the majority of the present-day cases.

The severity of rickets in the past so affected the pelvic brim that the importance of flat pelves overshadowed other less striking pelvic deformities. To-day gross flattening is uncommon, and contraction in any pelvic plane can arise in a haphazard fashion which defies strict morphological classification. Thus the classifications of Caldwell and Moloy (1933), of D'Esopo (1949), of Thoms (1935), and of other Americans, which have been so helpful in the study of congenital pelvic anomalies, are much less helpful in cases in which the contraction is due to pathological bony development. As an illustration of the type of patient which we are required to deliver in Glasgow it is of interest to note that over 18% of the last thousand women who attended the antenatal clinic at the Royal Maternity Hospital were under 5 feet (152 cm.) in height. I am not, of course, suggesting that all small women have small pelves, but many of those under 5 feet (152 cm.) do have some degree of contraction.

New Problems

With the reduction in the number of cases of severely contracted pelvis, we encounter new difficulties in diagnosis and new problems in management. I have stressed the importance of this elsewhere (MacLennan, 1944). The milder forms of pelvic contraction can easily be overlooked. On this account the importance of diagnosis is considerable, but that aspect will receive no further reference here.

As the incidence of severely contracted pelvis has lessened during the last 50 years, there has taken place concurrently an alteration in the methods of management in labour where contraction is present. A brief comment on the history of management of such cases will illustrate this and afford a more accurate appreciation of the methods which may be adopted at the present day.

Fifty years ago the effects of the Listerian principles were beginning to be felt and caesarean section had become a practical possibility. The controversy at that time concerned the wisdom of performing an elective caesarean section as a possible alternative to craniotomy. It can be seen from Table I that in 1903 the number of craniotomies was greater than the number of caesarean sections. It will also be observed that Porro caesarean section, symphysiotomy, and internal version were often practised. Craniotomies, indeed, continued to outnumber caesarean sections in the Royal Maternity Hospital until 1908 (Hewitt, 1950).

TABLE I.—*Incidence and Mode of Delivery in Common Use in the Glasgow Royal Maternity Hospital in* 1903

Total No. of deliveries	665
No. of cases of contracted pelvis	179 (27%)
Mode of Delivery	
Craniotomy	27 (2)
Caesarean section:	
Classical	15 (1)
Porro	5 (1)
Internal version and breech extract	6
Symphysiotomy	5
Forceps	94 (3)
Spontaneous	23
Breech	4 (2)

The figures in parentheses represent maternal deaths. There were also 73 foetal deaths, stillborn and neonatal, representing a maternal loss of 5% and a foetal loss of 40·8%.

Twenty-five years ago, in 1928, the picture had changed (Table II). Antisepsis had then been accepted and asepsis was practised, but, while the caesarean section rate had risen sharply, craniotomy was still performed. At that time the relative merits of trial labour and premature induction of labour were debated up and down the country. Divergent views were supported with some acrimony. It is now more clearly understood that the geographical distribution of contracted pelvis shows a wide variation and, to some extent, controversies arose in the past from a failure to appreciate that like was not being compared with like. It would appear, for example, that in Glasgow, where the incidence of contracted pelvis was high and the type severe, trial of labour and caesarean section appeared to give the best results. In other localities, where milder forms of pelvic contraction were encountered, induction of premature labour gave equally good results. To-day the degree of pelvic contraction is much less severe in Glasgow and similar industrial centres than formerly, and the condition more closely approximates in degree, although not in incidence, to pelvic contraction elsewhere (Table III). It should therefore be possible to-day to arrive at a method of management in contracted pelvis which would be more universally applicable.

TABLE II.—*Incidence and Mode of Delivery in Common Use in the Glasgow Royal Maternity Hospital in* 1928

Total No. of deliveries	2,603
No. of cases of contracted pelvis	231 (8·9%)
Mode of Delivery	
Craniotomy	23 (2)
Caesarean section:	
Classical	68 (3)
Lower segment	4 (1)
Premature induction (medical)	3
Internal version	1
Symphysiotomy	0
Forceps	62 (1)
Spontaneous	68
Breech	2

The figures in parentheses represent the 7 maternal deaths. There were also 66 foetal deaths, stillborn and neonatal, representing a maternal loss of 3% and a foetal loss of 28·6%.

TABLE III.—*Incidence and Mode of Delivery in Common Use in the Glasgow Royal Maternity Hospital in* 1953

Total No. of deliveries	3,398
No. of cases of contracted pelvis	134 (4%)
Mode of Delivery	
Craniotomy	0
Caesarean section:	
Classical	6
Lower segment	45*
Internal version	0
Symphysiotomy	0
Forceps	47†
Spontaneous	34*
Breech	2

There were no maternal deaths. There were 6 foetal deaths, stillborn and neonatal, representing a loss of 4·5%.
* Includes 3 cases of trial induction.
† Includes 4 cases of trial induction.

Whereas 50 years ago the choice of treatment lay between caesarean section and craniotomy, and 25 years ago between premature induction and trial of labour, to-day the choice is between elective caesarean section and some other method. The alternative method I should like to advocate would be trial induction—a procedure which is dealt with later.

Elective Caesarean Section

No one will deny that caesarean section has become a much safer operation than it was in the past. The improvement in surgical technique, modern anaesthesia, the all-embracing safety of the antibiotics, and better hospital facilities are among many factors which have contributed to this. The published results of many leading centres, both here and in America, prove the safety of this operation. Such striking figures as those produced by Marshall (1949) and the Liverpool school encourage a greater and greater use of the elective caesarean section. The very safety of this operation is giving it a popularity which might sow the seeds of its own destruction. Under ideal circumstances, where elective caesarean section is carried out by a team of "specialists within a specialty," this is undoubtedly true. But is it not possible to achieve equally good results by methods more universally applicable which do not involve laparotomy? When the great William Smellie found that his forceps were becoming over-popular he wrote, "If these expedients are used prematurely, when the nature of the case does not absolutely require such assistance, the mischief that may ensue will often overbalance the service for which they were intended" (Johnstone, 1952). This might equally

well be applied to caesarean section. Ultimately I hope that elective caesarean section will play a relatively small part in the management of the obstetric case with pelvic contraction.

To determine the best method of management to be adopted, a careful prenatal assessment should be carried out at the thirty-sixth week. This will determine the capacity of the pelvis when the foetus is small. At term the foetus may well be too large for safe vaginal delivery. Its size when labour starts spontaneously can only be surmised, for, should gestation be prolonged beyond term, the disproportion is likely to become even greater. It seems logical to suggest, therefore, that if pelvic contraction is the only abnormality labour should start when the foetus is known to be small and can traverse the pelvis with a reasonable degree of safety. Surgical induction can frequently initiate labour at this point in time. Only when the pelvis is so contracted as to require extreme prematurity to effect a vaginal delivery is induction contraindicated, and only then would an elective section at a later date be justified to secure a larger baby. But the majority of cases to-day show only slight contraction, and it should therefore be possible to achieve a fairly high rate of vaginal delivery of babies of reasonable size.

In a series of 269 primigravidae with slight pelvic contraction I already reported in 1944 a 96% vaginal delivery rate at term. In a similar series, 192 multiparae, again with slight contraction, had an 88% vaginal delivery rate at term. In this series the stillbirth rate was much too high and would not satisfy modern demands; indeed, it was four times as high as the rate in a control series with normal pelves. None the less, it demonstrates clearly that patients with slight degrees of pelvic contraction are able to deliver vaginally a very high percentage of their babies, and it only remains for us to find a method whereby this can be achieved without a high foetal loss.

The case for elective caesarean section is supported chiefly on the grounds that it diminishes foetal loss without materially increasing the maternal risk.

The high stillbirth and neonatal death rate in cases delivered vaginally is usually associated with a difficult forceps operation. In a recent study of a series of difficult forceps deliveries (MacLennan, Hay, and Paterson, 1953) the total foetal loss was found to be 11.4% where forceps were applied not only on account of contracted pelvis but following various forms of dystocia. By modern standards this high rate of loss is indefensible.

Trial Induction

The avoidance of difficult forceps delivery must therefore be the aim. This can be done only when the disproportion is minimal, and it is to achieve this that "trial induction"—that is, premature induction of labour followed by trial of vaginal delivery—is advocated. It must be appreciated that premature induction alone cannot give the best results, as induction does not in itself take account of such adverse factors as delay in the onset of labour, with consequent foetal distress. Nor can we be sure that the uterine muscular action will be adequate to effect delivery of even a small baby. For these reasons, and others, the induction should be regarded only as a trial, and if the trial of vaginal delivery seems likely to be unsuccessful recourse to caesarean section can be immediately and properly undertaken.

In the past, when premature induction was decided upon in preference to trial of labour at term, caesarean section could not be employed to rescue those cases of induction which seemed likely to fail for one reason or another; the risk to the mother and child by reason of infection was too great. To-day the situation is very different, and when the induction is embarked upon it must be fully realized at the outset that it may fail on several counts; when it has failed caesarean section can be employed with a very reasonable degree of safety under an antibiotic cover. But it does not always fail, and where it is successful caesarean section has been avoided without the foetal loss which has been the real handicap of vaginal delivery. This method of management of labour in cases in which the pelvis is contracted requires judgment, care, and team-work. It can be carried out only in hospital. To those who have been accustomed to conducting trial of labour at term it offers no real difficulty.

Criteria for Induction

There are, of course, a number of criteria which have to be observed if good results are to be obtained. It is important that the time of induction should be carefully chosen. A baby which is not too large to deliver easily and yet not too small to prejudice its survival is desirable. From a statistical survey the ideal weight would appear to be about 6 lb. (2.7 kg.) (MacLennan, 1944). All obstetricians acknowledge the difficulty in estimating a baby's weight prenatally. Even with the help of cephalometry Ince (1939) has shown that there is no close correlation in any given case between the weight of the child and the size of its head. At the same time most obstetricians would agree that with care it is very often possible to make a reasonably accurate assessment of a child's size, and in this respect an error in judgment can be remedied in labour. The dystocia which would follow such an error would nowadays demand intervention by caesarean section. The thirty-sixth to thirty-eighth week is the time when the 6-lb. (2.7-kg.) baby may most frequently be delivered.

The interval between surgical induction and the onset of labour must also be carefully observed. Where it is unduly prolonged, infection of the child *in utero* may take place; the danger of this can be largely offset by the administration of penicillin 24 hours after the induction operation. If the time of onset of labour is prolonged beyond 24 hours then the time for recourse to caesarean section must be chosen according to the circumstances which prevail in any given case. These circumstances concern the state of the cervix, the drainage of liquor amnii, the patient's general condition, and, of course, ultimately the size of the child. It is not reasonable to lay down any arbitrary time such as 24, 48, or 72 hours as being the point at which intervention is demanded. Early or late intervention according to circumstances is a factor implicit in any trial.

It is also impossible to forecast the quality of uterine action when labour has actually begun. Incoordinate uterine action or cervical achalasia may occur at any time. Here again caesarean section is justifiable when it has become apparent that labour is likely to be prolonged.

There is also the occasional case in which all criteria appear to be satisfied—no evidence of disproportion, a short induction labour interval, good uterine contractions—and yet dystocia arises from deep transverse arrest in a pelvis slightly contracted in the cavity or at the outlet. D'Esopo (1950) has drawn attention to the difficult forceps delivery which will be required in such cases and to the consequent foetal loss. But there is no need to embark upon a difficult forceps delivery even at this stage in labour. The patient and those who are in charge of her must be prepared for caesarean section at any stage of a trial induction. This "state of preparedness" for caesarean section where complications arise in a trial of induction and vaginal delivery is the most important aspect in the management of all cases of pelvic contraction managed in this way. Caesarean section must not be regarded as an admission of defeat but as the logical consequence of a threat to the foetal life. The greatest credit will go, not to those who avoid caesarean section altogether, but to those who use it only where there is a clear-cut and unequivocal threat to the mother or to the child.

Our experience of trial induction in management of labour in cases of slight contracted pelvis is not sufficient to be statistically significant, for it is only in recent years that we have appreciated the safety of combining the advantages of induction with the safety of caesarean section. It is, however, possible to show the results which have been obtained by two of my colleagues—Dr. R. J. Wotherspoon

at Lennox Castle Maternity Hospital, and Dr. R. A. Tennent at Bellshill Maternity Hospital (Table IV). These men,

Table IV.—*"Trial Induction" (Premature Surgical Induction followed by Trial of Vaginal Delivery)*

	No. of Cases Induced	Maternal Mortality	Foetal Mortality	Caesarean Section Rate
R. A. Tennent, Bellshill Maternity Hospital ..	121	Nil	1·7%	9·9%
R. J. Wotherspoon, Lennox Castle Maternity Hospital	43	,,	Nil	21·0%

working quite independently, have, I think you will agree, produced results which compare favourably with any other method of delivery, and in so doing have avoided many caesarean section operations.

Conclusion

Caesarean section has, in the last 15 years, become a boon. Let us avoid the pitfalls of the past and let us prevent this operation from falling into disrepute and becoming the first resort of the lazy obstetrician, the escape of the timid obstetrician, and the cloak of the incompetent. Let us use it wisely without holding it like the sword of Damocles over the head or body of the mother, whose only fault is that her pelvis lacks by a centimetre or so the proportions which would normally ensure natural childbirth.

Summary

Changes which have occurred during the last fifty years in the methods of managing labour in patients with contracted pelvis are outlined. It is shown that the destructive operation has now almost disappeared and that classical caesarean section has been largely superseded by the lower segment operation.

Reference is made to the alteration in the severity of contracted pelvis during the last fifty years, and the importance of the rachitic factor in the production of present-day pelvic contraction is mentioned. The role of the minor degrees of pelvic contraction as a cause of dystocia in labour is emphasized.

The tendency towards an ever-increasing elective caesarean section rate is fully discussed and criticized, and an attempt has been made to justify the use of trial of induction of premature labour in specially selected cases.

Where there is a minor degree of pelvic contraction premature surgical induction may initiate labour at a point where disproportion is minimal or non-existent.

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An annotated bibliography on *Pulmonary Fibrosis in Soft Coal Miners* has been published by the U.S. Public Health Service. The annotations, 83 in number, cover papers published from 1834 to 1953, and reveal the comprehensive studies which have been made of this condition in Britain and the U.S.A. The bibliography (Public Health Bibliography Series No. 11) is obtainable from the Superintendent of Documents, Government Printing Office, Washington, price 25 cents.

STREPTOMYCIN AND ISONIAZID IN ACUTE MILIARY TUBERCULOSIS

BY

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The present investigation consists of two series of patients suffering from acute miliary tuberculosis uncomplicated by meningitis at the beginning of treatment. The first group (series A) comprises 24 patients admitted to hospital during the period August, 1948, to June, 1951, and treated with streptomycin. All have been followed up for a period of two or more years. The second group (series B) comprises 12 cases treated with isoniazid, or isoniazid in combination with streptomycin or with streptomycin and P.A.S. These patients were admitted to hospital during the period April, 1952, to February, 1953.

The diagnosis of miliary tuberculosis was made primarily on radiological grounds; in 20 cases in series A, and in all cases in series B, additional confirmation was obtained from sputum examination and gastric lavage and by the presence of choroidal tubercles. Radiographs of the chest were taken at monthly intervals during the patient's stay in hospital, and at three- to six-monthly periods following dismissal.

The purpose of the investigation is to relate our experience of acute miliary tuberculosis treated with streptomycin and with isoniazid and to consider whether the use of isoniazid holds promise of advantage. It is realized that the investigation has the disadvantage that the patients in the two studies were not treated contemporaneously, and, further, that the smaller number of cases, plus the shorter follow-up period, in series B does not permit comparable therapeutic inferences. Nevertheless the difference between the two series in respect of the incidence of meningitis, despite the small number of cases involved, prompts us to publish our results.

Series A—Streptomycin

Adult patients admitted during the period 1948–50 were given 2 g. of streptomycin daily; for subsequent admissions this dosage was reduced by half. Patients under 15 years were given a dose of 20 mg. of streptomycin per lb. (44 mg. per kg.) body weight daily. Treatment was continued for four months or more.

With the exception of three patients admitted during 1948–9, all received sodium P.A.S. in addition to streptomycin. Adult patients were given 15 g. of sodium P.A.S. daily; the dose for patients under the age of 15 years was 0.25 g. per kg. body weight daily.

The figures in Table I show the fatality in age groups and illustrate the poor prognosis in children compared with a more favourable outcome in older patients. The death rate in the age group 0–3 years is 45.4% (5 out of 11), in contrast to 7.7% (1 out of 13) over the age of 3 years.

Table II shows the incidence of a complicating tuberculous meningitis in the 24 treated patients. Eight patients (33.3%) developed tuberculous meningitis, and of these 3 died, 2 of them being in the age group 0–3 years. In all cases the complication supervened during the course of

TABLE I.—*Age and Fatality*

Age Group (Years)	Alive	Dead	Total
0–3	6	5	11
4–15	7	—	7
16–25	4	1	5
26+	1	—	1
Total	18	6	24

TABLE II.—*Incidence of Tuberculous Meningitis: Series A*

Age Group (Years)	Alive	Dead	Total	Total Cases
0–3	2	2	4	11
4–15	1	—	1	7
16–25	2	1	3	5
26+	—	—	—	1
Total ..	5	3	8	24

streptomycin therapy. It will be seen that meningeal involvement occurred in one-third of the 24 patients and was responsible for 50% of the total deaths (see Table I).

The figures in Table III indicate that the time taken for the lungs to show complete clearance of miliary opacities is somewhat similar for all age groups in the 13 patients who recovered and who did not develop meningitis. The term

TABLE III.—*Radiological Progress in Uncomplicated Recoveries*

Age Group (Years)	Interval from Diagnosis to Clearing (Weeks)	Total
0–3	26 (12–36)	4
4–15	18·5 (8–28)	6
16–25	18 (12–24)	2
26+	16	1
	Mean 20·5	13

Figures in parentheses denote minimum and maximum values.

"uncomplicated" used in the title of this Table refers to meningitis and does not take account of other complications of miliary tuberculosis (see Table V). For the purposes of comparison the value 20.5 is regarded as the average time in weeks necessary for complete radiological clearing in uncomplicated recoveries.

In Table IV are analysed the eight cases complicated by meningitis. The shortest period of time for meningitis to develop from the diagnosis of miliary tuberculosis was four weeks (Cases 5 and 7); the longest period was six months (Cases 6 and 8). All cases occurred during the course of streptomycin therapy and within a period of six months of its inception. The average time of onset of meningitis was 14.8 weeks.

Table IV also shows the interval of time between diagnosis of miliary tuberculosis and complete radiological clearing of the lung lesions in those cases complicated by meningitis. In Case 3 calcified foci were seen after a follow-up

TABLE IV.—*Analysis of Cases Complicated by Meningitis*

Case No.	Age (Years)	Onset T.B.M. (Weeks)	Period of Observation (Years)	Interval from Diagnosis to Clearing (Weeks)	
				Recovery	Death
1	8/12	12	2	10	Lungs I.S.Q.
2	11/12	12	3/12		
3	2	20	2	Calcified lesions in lungs	
4	3	19	9/12		27
5	9	4	2	16	
6	17	24	2	20	
7	22	4	6/12		16
8	25	24	2	32	
	Mean 14·8			Mean 20·16	

period of two years. Analysis of the remaining seven patients reveals that in all cases of meningitis which survived more than six months radiological clearing took place in a minimum period of 10 weeks (Case 1) to a maximum period of 32 weeks (Case 8). The average time of clearing was 20.16 weeks, which is similar to the value of 20.5 weeks in the uncomplicated recoveries (Table III). (The figures are in agreement with those in the report of the Medical Research Council (1950) and support the view expressed in that report that clearing of miliary opacities in the lungs is no guide to prognosis.)

In Table V are enumerated complications occurring in patients in whom meningitis did not develop. Of the three fatal cases, all were under the age of 3 years. All died

TABLE V.—*Complications in Non-meningitis Cases*

Age (Years)	Complication	Result
1	Tuberculous abscess of chest wall ..	Recovered
1	Fulminating infection	Died
1	Tuberculous bronchial pneumonia ..	,,
2	Tuberculous peritonitis	,,
10	Renal tuberculosis	Recovered

within three months of the beginning of treatment; one, a baby of 1 year with a fulminating infection, died 48 hours after admission to hospital.

The three patients who did not receive P.A.S. were under the age of 2 years. One made an uneventful recovery, one died of tuberculous meningitis (Case 2, Table IV), and one died from a fulminating tuberculous infection 48 hours after the starting of treatment (Table V).

Series B

The 12 patients in this series were treated with isoniazid, or with isoniazid, streptomycin, and P.A.S., or with isoniazid and streptomycin. Patients who received P.A.S. were all over the age of 10 years and were given 15 g. of the sodium salt daily.

Six of the patients were given isoniazid alone in a daily dosage of 8 mg. per kg. in four cases, and 6 mg. per kg. in two cases. The duration of treatment was 18 weeks in four cases, 14 weeks in one case, and 24 weeks in one case. The chest *x*-ray films of one of these patients showed a focus of tuberculosis in addition to the miliary lesions; consequently, two months after the initial isoniazid therapy was completed, a further course of treatment—isoniazid, 8 mg. per kg. twice a week, and streptomycin, 1 g. twice a week on the same days as isoniazid, plus P.A.S. 15 g. daily—was instituted and continued for 18 weeks.

Two cases were treated with isoniazid 8 mg. per kg. daily, streptomycin 1 g. daily, and P.A.S. 15 g. daily. One of these received this treatment for 10 weeks, this being repeated for a further 12 weeks except that 1 g. of streptomycin was given twice a week instead of daily. The other was under the regime for 12 weeks, and then, owing to the development of sensitivity to streptomycin and P.A.S., isoniazid, 8 mg. per kg. daily, was given alone for a further 16 weeks. Two cases were treated with isoniazid 8 mg. per kg. daily, streptomycin 1 g. twice a week, and P.A.S. 15 g. daily; the duration of treatment was 28 weeks in each case. One case was treated with isoniazid 8 mg. per kg. three times a week, and streptomycin 1 g. three times a week, on the same days, plus P.A.S. 15 g. daily; the duration of therapy was 17 weeks. One case was treated with isoniazid, 8 mg. per kg. twice a week, and streptomycin twice a week on the same days; the duration of therapy was 28 weeks.

Age.—Seven patients were aged 4 to 15 years, three were 16 to 25, and two were 26 or more.

Length of Observation.—All patients were observed for over one year. There were no fatalities.

Clearing of X-ray Films.—The average time taken for the chest *x*-ray films to clear in series B was 19 weeks, and the average time taken in the six cases treated with isoniazid alone was 18 weeks. The longest time taken was 32 weeks and the shortest 11 weeks; in both these cases the treatment was isoniazid alone.

Complications.—No complications occurred.

Discussion

The results in series A, in which 24 patients were treated with streptomycin or streptomycin and P.A.S. daily are in accordance with those in similar series. The aspect with

which we are particularly concerned is the development of tuberculous meningitis during or after treatment, and it is seen that this complication occurred in one-third (33%) of the patients under this therapeutic regime. The Medical Research Council (1950) reported an incidence of 32% in 25 similarly treated patients, and the Ministry of Health Report (1950) stated that one-third of all cases of miliary tuberculosis will develop tuberculous meningitis despite streptomycin therapy.

The average time from the start of treatment to the development of tuberculous meningitis in series A was 14.8 weeks, and the longest time was 24 weeks.

In series B 12 patients were treated with isoniazid, alone or in combination with streptomycin or streptomycin and P.A.S., and tuberculous meningitis did not develop in any of them during a period of over one year.

Great stress cannot be placed on the results of series B, because the numbers involved were small and do not happen to include patients aged 3 years or less, in whom, judging from the experience of series A. tuberculous meningitis is most likely to develop. Nevertheless, the findings encourage hopes, based on the work of Elmendorf *et al.* (1952), Mackaness (1952), Mackaness and Smith (1952), and Suter (1952), that isoniazid therapy may reduce the incidence of tuberculous meningitis in cases of miliary tuberculosis under treatment. Elmendorf *et al.* found that isoniazid, unlike streptomycin, passes in practically full concentration from the blood to the C.S.F., and the other workers reported that isoniazid readily penetrates the cell membrane of histiocytes, so that it can attack any contained tubercle bacilli, whereas streptomycin does not. Further, Ritchie *et al.* (1953), on the basis of pathological studies of miliary tuberculosis and tuberculous meningitis, have reported that in both these conditions isoniazid causes a resolution of the lesions not seen with streptomycin.

In the first six cases of series B isoniazid alone was employed. As with a similar series of cases reported by Clark *et al.* (1952), the results were satisfactory, but as reports of various studies (Medical Research Council, 1953; and others) indicated that isoniazid combined with streptomycin was more effective against *M. tuberculosis* than either drug alone, various forms of combined therapy were used in the later cases.

Intermittent therapy was effective in the cases in which it was tried. Indeed, in one case in which streptomycin, 1 g., and isoniazid, 8 mg. per kg., were given on the same days twice a week, the *x*-ray films cleared in the short period of 12 weeks. Recent work by Hobby and Lenert (1953), however, does not suggest that intermittent therapy will prove superior to continuous therapy in acute cases of tuberculosis, for when mice which had been injected intravenously with tubercle bacilli were treated with isoniazid alone, streptomycin alone, and a combination of streptomycin and isoniazid (streptomycylidene isonicotinyl hydrazine), the treatment being given on two days a week, it was found that before comparable results were achieved the dosage given on these days had to be three to six times as great as the daily dosage required when treatment was given on five days a week.

Whatever may prove to be the most effective therapeutic regime in miliary tuberculosis, the results of the present investigation suggest that the use of isoniazid tends to prevent the development of tuberculous meningitis.

Summary

Twenty-four patients were treated with streptomycin or streptomycin and P.A.S. daily, and 33% developed tuberculous meningitis.

A later and not strictly comparable series of 12 patients was treated with isoniazid alone or with isoniazid in combination with streptomycin or with streptomycin and P.A.S., and none of them developed tuberculous meningitis over an observation period of at least one year.

Our thanks are due to Dr. A. L. K. Rankin, physician-superintendent, Belvidere Hospital, who kindly made available to us the case records of six patients included in series A; also to Dr. J. McIntosh, physician, Western District Hospital, who allowed one of us to treat two of his patients with isoniazid.

ADDENDUM.—Since this paper was written two further cases of miliary tuberculosis for inclusion in series B have been under observation for one year, making 14 cases in all in that series. In addition, 10 further cases of miliary tuberculosis have been observed for more than 24 weeks (which was the longest period of time taken for meningitis to develop in series A). In these further 12 cases there have been no fatalities and no complications. However, of four recent cases observed for less than 24 weeks, one patient, aged 9 months, developed tuberculous meningitis six weeks after the commencement of treatment.

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MILIARY TUBERCULOSIS OF THE BONE MARROW

WITH PARTICULAR REFERENCE TO THE POSSIBILITY OF DIAGNOSTIC ASPIRATION BIOPSY

BY

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Miliary tuberculosis may be diagnosed by the radiological appearance of the lungs in less than half of the cases in which the disease is found at necropsy. Steiner (1937) found the characteristic *x*-ray picture in 48% of 46 cases, and Chapman and Whorton (1946) in only 25% of 63 cases. The systematic search for choroidal tubercles provides an additional means of diagnosis, and Emery and Lorber (1950) showed that, in a series of 52 histologically proved cases of miliary tuberculosis, 18 were diagnosed by *x*-ray examination, 25 by retinoscopy, and 28 by a combination of the two methods. Thus the present methods of diagnosis are insensitive, and other methods warrant investigation.

Stahel (1939) described finding a miliary tubercle in an aspiration biopsy of sternal marrow. Schleicher (1946) published a series of eight cases in which he found miliary tubercles in the aspirated bone marrow of adults during clinical investigation. The investigation reported here is an attempt to assess the incidence of miliary tubercles in the bone marrow in cases of generalized miliary tuberculosis and to determine the potential value of bone-marrow aspiration in the clinical diagnosis of the condition.

Materials and Methods

The tissues used were ribs or sternum taken from routine necropsies on children dying in the Sheffield Children's Hospital between 1951 and 1954.

The diagnosis of generalized miliary tuberculosis was established by the finding of miliary tubercles in random sections in each of at least three organs, thus excluding some cases in which miliary tubercles were found only in the lungs and brain. These criteria were fulfilled by 44 cases, the ages of the children being from 6 months to 13 years.

Death in the majority of cases was due to tuberculous meningitis. The radiological criteria and method of search for choroidal tubercles have already been described (Illingworth and Wright, 1948; Emery and Lorber, 1950).

The number of tubercles found in a sample of bone marrow will depend upon the number present per volume, and the volume of, the specimen under examination. It follows that the examination of the maximum volume of bone marrow will give the greatest chance of success. Material aspirated from the medullary cavity of a bone consists of fragments of marrow, fat, the contents of the venous sinuses, and the blood flowing through the latter during aspiration, together with the admixture of blood released following trauma to medullary vessels. Schleicher (1944) and Pizzolato and Stasney (1947) investigated the volumetric pattern of aspirated normal human sternal marrow and found that the myeloid–erythroid elements (representing solely haemopoietic tissues) in 1 ml. of aspirated material constituted approximately 5% of the total—that is, 0.05 ml. For the purposes of the present investigation it was assumed that the volume of actual tissue which could be conveniently aspirated during life from a child would be 0.1 ml. For this reason we restricted the amount of bone marrow examined to this volume. An equivalent volume of bone marrow present in a rib or sternebra removed at necropsy was examined by serial section and the number of tubercles was noted. The histological sections, 5 μ in thickness, were cut from paraffin-embedded material and stained with haematoxylin and eosin. In order to examine the requisite volume of marrow it was necessary to inspect the apparently very large area of 200 square cm. of section.

Results

Miliary tubercles were found in 0.1 ml. of marrow in 13 out of the 44 cases examined. The number of tubercles counted, together with the results of *x*-ray examination of the chest and fundus during life, is shown in the Table.

Results of Radiological and Fundal Examination Related to the Number of Miliary Tubercles seen in 0.1 *ml. of Bone Marrow*

Case	Choroidal Tubercles	*X*-ray Examination of Chest	No. of Tubercles Seen
1	−	+	2
2	−	−	3
3	+	+	1
4	+	+	3
5	−	−	1
6	+	+	6
7	+	+	1
8	+	+	1
9	−	−	2
10	−	+	11
11	−	−	3
12	−	−	1
13	+	+	5 ✓

The maximum number of tubercles seen in any one case was 11. It will be noted that the greatest number of tubercles were present in those cases diagnosed by clinical investigation during life.

Discussion

The clinical records of the 44 children showed that the diagnosis of miliary tuberculosis had been made independently on the radiographic appearance of the chest in 14 cases and by retinal examination in 13 cases. These two methods, when combined, established the diagnosis in 18 cases. Tubercles were found in 0.1 ml. of marrow in 13 out of the 44 cases, and these included 5 cases in which choroidal tubercles were not seen and *x*-ray examinations were negative. Thus in this series, bone-marrow aspiration biopsy could be expected to contribute a positive diagnosis in an additional 5 (11%) cases.

By using the three procedures in conjunction a clinical diagnosis would seem possible in twice the number of cases detected by any one method. It is interesting to note that each method of diagnosis used independently yielded a positive diagnosis in an approximately equal number of cases. This, in regard to the finding of choroidal tubercles, is not surprising, as it is likely that the actual amount of tissue surveyed in the retina is very similar to that examined in the bone marrow.

The probability of finding tubercles in the bone marrow will depend largely on the volume of tissues examined. This is borne out by our own material, for in the single section examined routinely from each of the 44 cases tubercles were seen only once.

The estimation of the amount of marrow tissue obtained by aspiration biopsy is difficult and the literature is extremely vague on the subject. The volume of 0.1 ml. which we used was considered to be the maximum obtainable from a child, but this quantity could be exceeded in adults, particularly if punctures are made at several sites.

It is obvious that the search for miliary tubercles in a specimen of bone marrow must be a scrupulous systematic examination of marrow tissue, and its purpose and scope quite independent of the extensive but equivocal cytological changes described in tuberculosis (Leitner, 1949). A histological method is essential, involving the careful embedding of marrow particles followed by serial section (White, Baker, and Griffin, 1946). In terms of laboratory time this procedure is both lengthy and expensive, but perhaps not excessively so when compared with other diagnostic procedures.

The finding of tuberculous tissue in bone marrow reopens the question of the value of the culture of aspirated bone marrow for tubercle bacilli (Bernabó-Silorata and Saita, 1938).

Our findings suggest that bone-marrow aspiration biopsy in miliary tuberculosis is a diagnostic procedure theoretically as useful in clinical diagnosis as either an *x*-ray film of the chest or examination of the eye. From a practical point of view it would be a reasonable procedure in cases in which miliary tuberculosis is suspected but not confirmed by *x*-ray examination or search of the eye fundus. Aspiration biopsy may also be of value in similar circumstances in cases of suspected tuberculous meningitis in which the spinal fluid changes are equivocal and organisms not found.

Summary

Miliary tubercles were found in 0.1 ml. of bone marrow in 13 out of 44 children dying with generalized miliary tuberculosis.

In these 44 children the clinical diagnoses of miliary tuberculosis had been made by a combination of radiography of the chest and examination of the eye fundi in 18 cases. Marrow biopsy would have enabled the clinical diagnosis to be made in a further five cases. It is suggested that bone-marrow aspiration biopsy has a place in the diagnosis of generalized tuberculosis.

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CLINICAL AND CHEMICAL STUDIES IN HUMAN LACTATION

VIII. RELATIONSHIP OF THE AGE, PHYSIQUE, AND NUTRITIONAL STATUS OF THE MOTHER TO THE YIELD AND COMPOSITION OF HER MILK

BY

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It seems reasonable to assume that the well-grown, healthy, and well-fed woman will produce more and better milk than one who is stunted, unhealthy, and ill-nourished. The age and parity of the mother might also be expected to have some influence on lactation. Any assessment of the importance of such physiological and environmental factors must take into account the great individual variations in genetic potential for lactation, since small differences would be readily obscured by this innate variation. Surprisingly little has been published on this subject, but the following is a short summary of what is known.

Age and Parity

It is well known that many reproductive phenomena are less efficient in first than in immediately succeeding pregnancies, and so the first lactation may be less successful than the second and subsequent lactations. Age may also be influential, especially in primiparae, and the clinical impression is certainly widespread that the elderly primipara is particularly liable to experience difficulty in establishing and maintaining lactation. There have been few studies in which age effects have been differentiated from those of parity. Ström (1948) found that milk output between the second and seventh days declined as age increased in both primiparae and multiparae, but in multiparae the decline was a little less steep, and the average output at a given age was consistently higher than in primiparae. This has been confirmed by Waller (1950), in respect of milk production on the fifth and tenth days of lactation, and by Dean (1951), who found, in a group of varying parity, a steady fall in milk yield with increasing age during the first week of lactation. Both Ström and Waller showed a mean fall of the order of 40% in the yield of both primiparae and multiparae from the age of 20 to age 30 and over.

Morrison (1952) summarized the evidence relating age to milk composition, but found it difficult to draw any definite conclusion because of the varying sampling methods used by different observers.

Health and Nutrition

Well-nourished people generally experience better health than the ill-nourished (Thomson and Duncan, 1954). Physical development is dependent on the standard of nutrition during the growing years, and retardation of growth, with consequent short stature, is often associated with poor nutrition. Height and general health were found to be related to the incidence of stillbirths and prematurity (Baird, 1952a), to the birth weight of babies born at term (Thomson, 1951), to pelvic deformity (Bernard, 1952), and to dystocia (Baird, 1952b). It would therefore not be unexpected if height were found to be related to lactation. Wardlaw and Dart (1934), in the only published study relating lactation to height and nutritional status, showed, in a series of 145 healthy women, that those of short stature had a significantly smaller milk output than the rest, and that the "state of nutrition," judged by the fatness of the subject, was not related to the yield. The fat content of the milk was unrelated to either stature or fatness, but, since the samples of milk were from only one feed at an unspecified time of day and stage of lactation, the results cannot be interpreted.

Since the second world war a number of reports have been published on breast-feeding by malnourished women in prisoner-of-war camps (Williams, 1946; Abels, 1949) and in areas of famine (Antonov, 1947; Smith, 1947), but no precise information is available about the quantity or quality of milk produced in these circumstances.

In this paper the relationship of lactation to the age, height, general physical health, net weight change during pregnancy, and diet during pregnancy in a group of 155 primiparae is discussed.

Method

At the first visit to the antenatal clinic the general health and physique of all women in the series was carefully assessed, and graded on a five-point scale from "excellent" to "very poor" by a senior obstetrician. The height was taken at the first visit, and the weight at each visit and again on the day of discharge from hospital (usually 8 to 10 days after delivery). In this series "net weight change" is the difference between the post-natal weight and the weight at or before the 14th week of pregnancy, and this figure is available for only 110 subjects who attended the antenatal clinic at or before the 14th week of pregnancy. In 55 cases individual diet surveys, by the method of weighing total food intake for one week, were made during the seventh month of pregnancy. Methods of milk collection and analysis have been described previously (Hytten, 1954a, 1954b).

Results

Significant negative correlations were found between the yield of milk on the seventh day and both maternal age and net weight change resulting from pregnancy.* That is to say, milk yield tended to be low in older primiparae and in those who made a large net weight gain—probably body fat—during pregnancy. The relationship with age is shown in Fig. 1 and the Table. It can be seen from Fig. 1

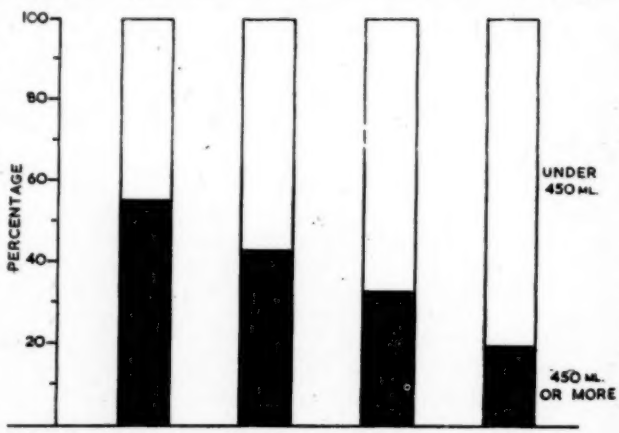

FIG. 1.—The relationship of the age of the mother to her milk yield on the seventh post-partum day. The ages have been divided into four-year rather than the usual five-year groups to give a more even distribution of numbers.

that the percentage of primiparae having a milk yield of 450 ml. or more falls from 55% in the age group 16–19 to 19% in those of 28 or over. (450 ml. is approximately 12½ oz., or 2½ oz. per feed.) The relationship of milk yield to net weight gain is shown in Fig. 2. None of the major constituents of milk was related either to age or to weight change.

*In the 110 cases for which complete data were available *the regression equation is:*

Milk yield (ml.) = 685 − (10 x age in years) ± 4 − (5 x weight gain in lb.) ± 2

The partial correlation coefficients were:

Volume and age, for constant weight gain $r = -0.27$ ($P < 0.01$)

Volume and weight gain, for constant age $r = -0.21$ ($P < 0.05$)

Multiple correlation coefficient:

Yield with age and weight gain together $R = 0.33$ ($P < 0.01$)

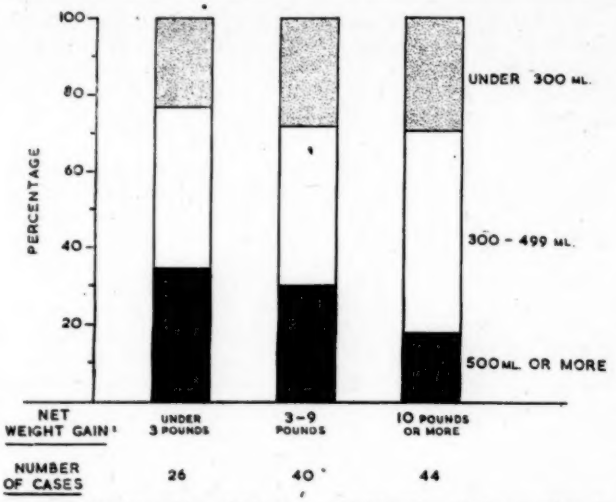

FIG. 2.—Relationship of the net weight gain of the mother in pregnancy to her milk yield on the seventh post-partum day.

The data relating yield and fat content of milk yield to height and physical grading suggest trends in the expected direction—that is, a higher milk yield and a higher fat content in well-grown women and in women assessed as being of "excellent" or "very good" physique and health. However, none of these trends is consistent or statistically significant with the relatively small numbers studied.

Relationship of Maternal Age and Milk Yield on the Seventh Post-partum Day in 155 *Primiparae*

Age	7th-day Milk Yield (ml.)					
	<250	250–	350–	450–	550+	Total
16–19	2	4	7	8	8	29
20–23	10	12	15	17	10	64
24–27	6	8	7	4	6	31
28+	7	1	17	4	2	31

No correlation was found between milk yield and composition and the energy value and composition of the mother's diet during pregnancy.

Discussion

The present material indicates that, within the range of general health and nutrition existing in the city of Aberdeen, any correlations which exist between them and the milk yield and composition are of a very low order and of no prognostic importance in the individual woman.

The probable reason for the very significant relationship between milk yield and the age of the mother was discussed in a previous paper (Hytten, 1954c). It was suggested there that the milk yield is primarily dependent on the amount of functional tissue in the breasts, and that this seems to diminish with increasing age, possibly as a result of disuse atrophy. The capacity to lactate is greatest under the age of 20 and diminishes even during the early twenties.

The relationship between milk yield and net weight change is not so easy to explain. The relationship extends throughout the range of weight change. For example, the woman who lost the greatest amount of weight between the 14th week of pregnancy and the seventh post-partum day—18 lb. (8.2 kg.)—had the exceptionally high milk yield of 800 ml., and the woman with the greatest net weight gain—28 lb. (12.7 kg.)—had a yield of only 250 ml. In some women the reproductive processes seem to have first call on all nutrients and are maintained even at the expense of maternal tissue, while in others nutrients are stored rather than used for such activities as milk production.

The final papers in this series will deal, not with the basic ability to lactate, but with the way this ability is used to maintain breast-feeding, and it therefore seems appropriate at this point to summarize what is known about human lactation.

It is not easy to study breast milk, since comparable samples can be obtained only by collecting the whole 24-hours secretion at a fixed stage of lactation. However, this sample can be taken as early as the seventh post-partum day, when most women are still in hospital, and it gives a reliable estimate of lactation as a whole. Milk taken under such standard conditions of sampling varies greatly in both yield and fat content. Because of deficiencies in fat content alone, probably about one woman in five is unable to nourish her baby satisfactorily for more than a few weeks. The fat content is, for practical purposes, not influenced by the general health and nutrition of the mother, so the wide range of values is unlikely to be affected by any general improvement in the health and nutrition of potential mothers. The evidence for the genetic determination of fat content of breast milk would be greatly strengthened if it were found to be constant in successive lactations.

The yield of milk depends on the amount of secretory tissue in the breast. This bears no fixed relationship to the size of the breast, but is highly correlated to the enlargement which occurs during pregnancy. The response of the breast to pregnancy shows wide individual variations, and, while the quantity of secretory tissue seems to be largely an individual characteristic, it diminishes with increasing age at the first pregnancy, possibly as a result of disuse atrophy.

Both the yield and the fat content of the seventh-day milk are closely related to the weight gain of the baby and the duration of breast-feeding, but their precise effects are obscured by the numerous other factors which determine whether a woman will breast-feed. Nevertheless, it appears that about one-third of women have an inadequate capacity for lactation because of either a poor milk yield or a low fat content, or both.

If this finding is generally applicable—and there is no reason to believe that the sample of women studied was unrepresentative or that local conditions are unique—then some modification of existing attitudes to breast-feeding and its management is called for.

Summary

The age and the general health and physique of 155 women were compared with the yield and composition of their milk on the seventh day of lactation. For 110 of the women the net weight change in pregnancy was known, and for 55 the results of a diet survey, undertaken during the seventh month of pregnancy, were also available.

The milk yield was negatively correlated with the age of the mother and with her net weight change in pregnancy at a high level of significance. The fat content of the milk was not related to either.

Both yield and fat content showed a relationship with general health and physique in the expected direction, but these trends were neither consistent nor statistically significant.

The diet taken during pregnancy was not related to either the yield or the composition of milk.

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RECOGNITION OF TUBERCULOSIS IN CHILDREN UNDER 2 YEARS

BY

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Modern therapy is so effective that the diagnosis of tuberculous meningitis or miliary tuberculosis is a matter of urgency. Yet if we rely upon the traditional methods diagnosis would be made too late for effective treatment. We must therefore try to recognize primary tuberculosis before serious complications occur, and our purpose in this paper is to demonstrate the ways in which tuberculosis becomes manifest in young children and to discuss the diagnosis. To do this we use records of 313 children known to have been infected in the first two years of life and seen in either the children's departments or the tuberculosis contact clinics in Newcastle-upon-Tyne between 1946 and 1950. Of these 313 children, 150 were admitted to hospital ill when first seen and 163 were examined initially as contacts, 62 of the latter being admitted to hospital during the subsequent period of observation. In all, therefore, 212 children were admitted to hospital and 101, though infected, remained at home.

We begin with a reminder of the development of the primary complex and its characteristics in young infants.

Natural History of Tuberculous Infection in Early Childhood

Whenever or wherever the first infection with tuberculosis occurs there is a local lesion at the site with enlargement and caseation of the nearest lymph nodes. The primary focus and enlarged nodes are together known as the primary complex. Although this complex is a constant anatomical finding, the results of infection vary with the age of the child. The major fear is the development of haematogenous dissemination or tuberculous meningitis.

The child of 2 years has not developed his full capacity to localize infection (Burnet, 1952), and the risk of generalized tuberculosis or tuberculous meningitis is certainly greater than after infection in older children. Serious complications occur in at least 5% and possibly as many as 10% of children infected in the first two years of life (Cammock and Miller, 1953). Of children who get tuberculous meningitis or miliary tuberculosis, 85% do so in the first year after infection, and either complication is uncommon more than two years afterwards (Wallgren, 1948). For the same reason the risk of bone disease in the first two years is probably greater than the average risk (1–2%) in all children infected under 5 years (Cammock and Miller, 1953).

The regional lymph nodes caseate and often soften; in superficial glands giving abscesses, and in the mediastinum ulceration and destruction of the walls of adjacent bronchi, often allowing either the aspiration of caseous material or, if the mass of material is harder and larger, obstruction with consolidation or collapse of the lung beyond.

In contrast to the increased risk of haematogenous spread and progressive lung disease, the young infant is not so likely to develop erythema nodosum or phlyctenular conjunctivitis. Nor does the young infant develop the three-weeks febrile illness ("fever of onset") without localizing signs seen so often in older children (Wallgren, 1948).

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Epidemiology.—In Newcastle 2% of children are infected before the age of 2 (Cammock and Miller, 1953). The lung is the commonest site; 253 of our 313 children had radiological evidence of lung infection, while only six had evidence of abdominal infection, and two of these had been in contact with an adult with "open" phthisis. In 28 cases the first sign was swelling of lymph nodes in the neck, and these almost certainly had nasopharyngeal infections. Only seven had ever consumed "raw" milk, but 14 had lived in close contact with infective adults. Almost all the 313 children lived in urban or industrial surroundings, and in 256 (82%) we knew of contact with an infective adult; 217 of the infectors lived in the same house as the child and 201 were relatives. Contact was known in 86 of the children admitted immediately to hospital, and by systematic examination of families 15 new and hitherto unsuspected cases of active phthisis were found, making 101 in all.

Diagnosis

How can we use these few basic facts of epidemiology and natural history to recognize tuberculosis earlier? Diagnosis is suspicion confirmed. Let us therefore consider when we should suspect and how we can confirm or disprove our suspicions.

When should Tuberculosis be Suspected?—From the beginning we must distinguish two groups of children: those infected with tuberculosis but symptomless and apparently healthy, and those with manifest illness.

Symptomless Primary Complex.—First the child with symptomless primary complex: in infants, indeed in children generally, symptomless primary infection is usually discovered by routine tuberculin-testing in infant welfare centres, hospital out-patient departments, or tuberculosis contact clinics. Sometimes such testing is rather thoughtlessly said to be "unnecessary" or even "meddlesome"; but on reflection we see that it is enormously important for the family doctor to know the child is infected, and this knowledge may be of great assistance in making an early diagnosis if complications unfortunately do occur; we should therefore encourage rather than discourage the routine use of tuberculin tests in clinics and in family practice.

Presenting Illness in 150 Infected Children Under 2 Years Admitted to Hospital Suffering from Tuberculosis

Tuberculous meningitis	48	32·0%
Pulmonary disease, including miliary (14)	56	37·3%
Lymphadenitis: cervical or other superficial	28	18·7%
Bone and joint	10	6·7%
Abdominal tuberculosis	4	
Skin: Primary infection	2	5·3%
Skin: Erythema nodosum	2	
	150	100%

Manifest Disease

In the Table we show the illnesses in 150 children on admission to hospital. In a third the symptoms were caused by the primary lung complex or its local complications. In another third the presenting illness was tuberculous meningitis. Sometimes the child has been in good health until the onset of meningitis; at other times there had been vague ill-health or failure to thrive for some weeks previously. Nearly one-fifth had superficial tuberculous lymphadenitis. Bone or joint disease was seen comparatively infrequently, and under urban conditions abdominal tuberculosis is now quite uncommon. Erythema nodosum was the presenting sign in only two cases, and phlyctenular conjunctivitis was not recorded as the presenting sign in any case.

Primary Lung Infection.—Sweating or haemoptysis practically never occurs; almost always, if clinical signs are present, the primary lung lesion is to be suspected by one or more of the following: (1) *Failure to gain* or loss of weight, with vague ill-health in the absence of abnormal physical signs or acute illness. (2) *Cough*:—Suspect any harsh dry cough which is not whooping-cough and is unaccompanied by upper respiratory infection. Sometimes the cough is spasmodic and occasionally is followed by vomiting, so that differentiation from whooping-cough is almost impossible on clinical grounds alone. (3) *Wheeze*:—In

young infants, as mediastinal glands enlarge and press upon the trachea there may be a gentle inspiratory and expiratory wheeze. Made louder on crying, it may disappear altogether in sleep. The wheeze may be mistaken for "asthma," but true sensitivity asthma is unusual under 2 years of age.

Many children with chronic upper respiratory infection, especially if they are fat, get attacks of wheezing or recurrent bronchitis. But any child who does wheeze and continues to do so for more than a week or so should have a tuberculin test. Sometimes primary tuberculous infection and non-tuberculous recurrent wheezy bronchitis occur together. Widespread rales and rhonchi can then be heard over both lungs; otherwise gross physical signs are usually absent unless the primary focus is enlarging and lung tissue is being destroyed or there is extensive lung collapse. Indeed, the more signs heard in the chest the less likely is the underlying disease to be tuberculosis.

Another difference between the young infant and the older child is that, in the former, pleural effusion is rarely seen and then not as an acute febrile illness. Indeed, at this age a tuberculous pleural effusion is usually discovered accidentally on routine radiography in a child who is not thriving; in the 313 children it occurred five times, only once as an acute illness. Complications due to bronchial involvement are more common. Bronchial stenosis often results: as many as 24 of the 251 survivors of the 313 children appear to have permanent structural damage in the lungs.

Tuberculous Meningitis

Tuberculous meningitis is due to the rupture of a subcortical or meningeal caseous nodule deposited there by the blood (Rich and McCordock, 1929) or as part of a miliary spread.

Treatment with streptomycin, and now isoniazid, has completely changed the prognosis. Although the treatment is prolonged and is still exacting for the child, the parents, and the doctor, there is the hope that it will become less so in the immediate future. Fifty per cent. of all cases and nearly 80% of early cases now survive. If relapse does not occur within two years the outlook seems good. Certainly the most important factor in prognosis is delay in treatment. This brings us to the need for early diagnosis.

Diagnosis is difficult because signs are not distinctive, and for the first few days of the illness there may be little change from normal. Furthermore, like many of the acute emergencies in childhood, tuberculous meningitis is not a common disease. The 30,000 children under 2 years of age on Tyneside yield about 20–30 cases a year, scattered in more than 200 practices. A doctor might practise years without seeing a case. Yet to wait until neurological signs are definite is to wait too long. Diagnosis must be based upon suspicion or knowledge of contact with tuberculosis, upon tuberculin-testing, upon alteration in the child's temperament as related by the mother, and upon the careful ascertainment of one important physical sign—neck stiffness. Of great importance are listlessness in a previously active child, irritability unusual for the child, interruption or alteration of consciousness without an obvious cause, or unexplained intermittent vomiting for more than three days. Neck stiffness is difficult to measure, for the conditions of examination may be unfavourable and it can be properly elicited only with the infant at rest. Detection is a matter of experience. The doctor's hand is slipped gently under the child's head, kept there until his attention is diverted and he is restful, then slowly raised so that the neck is flexed without the child offering voluntary resistance. In the healthy child the head will flex without resistance until the chin touches the chest wall. If neck stiffness is present, resistance is felt before full flexion is reached. Sometimes the child protests if the movement causes headache, yet resistance cannot be detected. Kernig's sign is unreliable in young children, and other neurological signs are merely indications of advanced disease.

Yet even neck stiffness may be absent for the first few days of the illness (it was noted in only half of our cases at the first examination), and we may have to rely upon alteration of behaviour, listlessness, abdominal pain, crying, and vomiting. The great step is to suspect the illness and to take the necessary steps to exclude it.

Superficial Tuberculous Lymphadenitis

We were surprised that as many as 10% of young children should have presented with visible superficial tuberculous lymphadenitis, and that as many as 37 of the 313 had superficial tuberculous lymphadenitis at some stage while under observation; in 27 it was in cervical glands, and in the remainder in auricular or inguinal glands. Four primary foci were demonstrated on the skin, two were visible on a tonsil, and in the conjunctiva (Miller, 1953); three others were presumed to be in the middle ear associated with tuberculous mastoiditis and post-auricular glands. In the remainder the primary lesion could not be found, but presumably it existed somewhere in the throat or nasopharynx. On radiographic examination 12 showed definite and three probable evidence of a primary lung lesion. We think, therefore, that simultaneous primary infection of the upper respiratory tract and the lungs is not very uncommon, and that in the great majority of cases the infection is human in origin. Often the swollen gland is found accidentally when the mother is nursing or washing the child; it is painless and hard, and, if watched carefully, slow progressive enlargement is seen to occur over some weeks, until in most cases softening leads to redness of the skin. Sometimes the child reacts much more sharply with fever, local tenderness, and periadenitis, so that it is quite impossible to determine the infecting organism by clinical examination alone. A tuberculin test is always necessary as part of the examination. Although a negative tuberculin reaction eliminates tuberculosis as a cause of the lymphadenitis, it must be remembered that a positive reaction does not prove that the lymphadenitis is tuberculous. Five of the 313 children had pyococcal cervical abscesses after becoming tuberculin-positive.

Skeletal Tuberculosis

Though only 10 of our 150 ill infants presented with bone tuberculosis as an initial sign of illness, 26 of the 313 children developed such lesions during the time of observation; two others had foci apparently limited to synovial membrane. Three children had more than one bone lesion. There were seven cases of tuberculous mastoiditis, probably caused by local extension from the middle ear. The mastoid process excluded, bone or joint lesions are caused by spread from a distant primary complex. The spine or bones of the legs are most commonly affected. The lesions all appeared within two years of primary infection, and 21 of the 26 children had symptoms before their second birthday. The diagnosis of tuberculous disease of bone is possible at all ages before the development of gross physical signs; the first indication is limitation of function and involuntary guarding of the affected limb. Young children do not complain of localized pain; they become fretful, are less active, go off their feet, walk with a limp when they are moved. Any of these complaints requires both a tuberculin test and radiography. A diagnosis of tuberculous osteitis cannot be sustained in the presence of a negative tuberculin reaction.

One new experience is the development of bone lesions sometimes as long as two years after miliary tuberculosis or tuberculous meningitis has been cured (two cases in this series). In another series 4 out of 16 bone lesions were in such children (Cammock and Miller, 1953).

Confirmation of Diagnosis

So far we have considered the way in which tuberculosis presents and when it should be suspected. How can it be confirmed? Ultimate *proof* must be the recovery of the tubercle bacillus, but diagnosis is usually made by a combination of tuberculin-testing and radiography.

The importance of the tuberculin test in paediatrics cannot be overestimated. It is part of any complete examination.

and it is necessary in order to help to assess the significance of radiological changes found in the chest or bones. As in everything else, experience of the relative advantages of different methods is required.

The test gives a positive result four to six weeks after primary infection, and thereafter a positive reaction means simply that a child has undergone primary infection. It does not mean that any particular illness is tuberculous in origin, but it emphasizes the possibility, or indeed with a young child the probability, that it is so.

A negative reaction is important, for the presence of tuberculosis is practically dismissed unless the child is very ill, when other physical signs are almost certainly present.

Two tests are in general use—the percutaneous (jelly) and intradermal (Mantoux). In the jelly test the skin is carefully cleaned with acetone or ether, and a petroleum jelly ointment containing Old Tuberculin is placed on the skin; usually the child's initial or a "v" mark is outlined with the jelly, to the length of about 1 in. (2.5 cm.). This is covered with a piece of strapping without any intervening lint. After 48 hours the strapping is removed and the skin examined 72 hours later—that is, after five days. This interval allows any strapping reaction to fade and gives a delayed tuberculin reaction time to appear. The result is not often in doubt. There is either no reaction whatsoever or, if positive, a reddish-brown slightly raised area; or sometimes a line of papules, not indurated or oedematous, will show on the skin in contact with the jelly. It is best to regard any reaction as positive until proved otherwise, but sometimes if only two or three papules are present the intradermal test will be necessary. We do not recommend the use of flourpaper (very fine sandpaper) in testing children under 5 years of age. The jelly test is roughly equivalent to 0.1 ml. of 1:1,000 Old Tuberculin by intradermal injection. It is most useful in clinic work where repeated tests are necessary and time is not important. Avoiding a prick, the doctor retains the child's confidence. But it takes five days, and occasionally an intradermal tuberculin test is necessary afterwards. So if there is any urgency, if the child is ill and tuberculosis seems likely, an intradermal (Mantoux) test should be used. The intradermal test consists of the intradermal injection of 0.1 ml. of 1:1,000 Old Tuberculin; 48 hours later a weal or area of induration more than 5 mm. in diameter indicates a positive reaction. Redness without induration is ignored, and redness surrounding a weal is not included in measurement.

The reactions of the tests are therefore very different and should not be compared. That of the jelly is on the skin—a series of small spots, papules, or vesicles which sometimes coalesce; that of the intradermal test is oedema in the skin at the site of injection. Every child with a positive reaction should be known to his family doctor, and it is most important that the results of tuberculin tests done in clinics or elsewhere should be communicated to him. It is also important that he should recognize the significance of the information and its value if the child becomes ill.

Why is this Urgency Necessary?

Almost all deaths from tuberculosis in infancy are the result of tuberculous meningitis or miliary tuberculosis. Both conditions are now treatable. In the early stages of tuberculous meningitis (uncomplicated by radiological miliary spread) there is a 75% chance of survival and a 50% chance of complete recovery; in the later stages 30% survival and only 10% complete recovery (Lorber, 1954). In meningitis alone the results are better than if miliary is also present. Relapse may occur, but it is unlikely after two years: the results depend almost entirely upon the stage at which diagnosis is made and treatment started. In the great majority of cases the first person to see the *ill* child is the family doctor, and his is the most difficult role of all. He must suspect and seek confirmation of his suspicions: early diagnosis depends upon the use of the tuberculin test, radiology, lumbar puncture, and bacteriological proof.

Summary

In this paper we have dealt with the recognition of tuberculosis in young children, arguing that diagnosis by clinical signs is outmoded and that early recognition requires above all suspicion, followed by tuberculin-testing, radiology, or other investigation.

One-third of 150 *ill* children presented with illnesses caused by lung primary lesions or miliary tuberculosis; one-third with tuberculous meningitis; one-fifth with superficial lymphadenitis. Bone lesions are relatively uncommon and sensitivity phenomena quite uncommon at this age.

The techniques and relative roles of the tuberculin jelly test and Mantoux test are considered.

We wish to thank our colleagues who allowed the use of records of children under their care, Dr. George Brewis, Dr. Donald Court, Dr. George Davison, and Dr. G. A. Neligan; and the late Professor Sir James Spence for his constant encouragement of our work on childhood tuberculosis.

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HISTOPLASMIN SENSITIVITY IN UGANDA

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Histoplasmosis was first known as a rare severe generalized infection, but during the past ten years American workers have shown that there is also a benign and usually symptomless form producing pulmonary infiltration followed by calcification. It is commonest in the United States, between the Mississippi and the Arkansas Rivers, where incidences of up to 80% of positive reactions to the intradermal injection of histoplasmin have been recorded. The geographical distribution of cases of proved histoplasmosis and of histoplasmin sensitivity have been ably reviewed by Mochi and Edwards (1952).

A few cases of the generalized disease have been diagnosed in Africa. In the Union of South Africa Simson and Barnetson (1942) encountered one, Lurie (1949) two, Murray and Brandt (1951) three, and B. A. Dormer one (Mochi and Edwards, 1952); in French and Anglo-Egyptian Sudan Catanei and Kervran (1945), Kervran and Aretas (1947), and Jelliffe (1949) found other cases, while one has been reported from Senegal by Friess and Delvoye (1947) and from Belgian Congo by Dubois *et al.* (1952). *Histoplasma capsulatum* in Africa may be a different and unusually large form, as in the cases of cutaneous disease seen by Duncan (1947) in a man who had been in West Africa. In another British case the patient had been in Sudan, as well as in

India (Derry *et al.*, 1942). There is thus no doubt that the organism occurs in Africa, and it is likely that the benign form of the disease may be found there.

Several surveys have been made in Africa. In the Nile delta no positive skin reactions were obtained in 380 persons (Mochi and Edwards, 1952). Jackson (1952) found three reactors in about 200 tested in South Africa. In Natal none were positive in the high mountainous Drakensberg, 1.6% were positive on the coast, and 5.9% were positive in Durban (Mochi and Edwards, 1952). In Transvaal, Lurie (1949) found as many as 8% positive, and in Kenya, Stott (1954) found 14.6% of a group of miners and 5.3% of prisoners with positive reactions. Twenty-three of the tuberculin-negative prisoners were *x*-rayed, and two had pulmonary calcification—one of them had a positive and the other a minimal reaction to histoplasmin. Among the remaining 21 prisoners there were only three who reacted at all to histoplasmin. The incidence of calcification in men who were *x*-rayed was four times as high in those with both tests positive as in those with positive tuberculin but negative histoplasmin reactions.

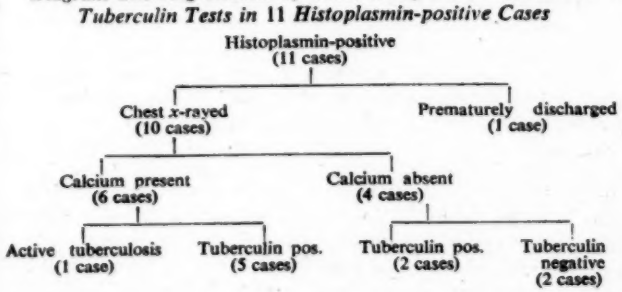
Uganda

"A broad view of the districts where sensitivity is found suggests that priority in the search for new endemic centres might be given to low-altitude regions along large rivers" (Mochi and Edwards, 1952). Uganda lies at a high altitude, the area from which most of our patients came being about 4,000 feet (1,220 metres) above sea-level and consisting chiefly of rolling cultivated land near swamps or lakes. We tested 175 persons, all being native Africans. Of these, 145 were adults, often of indeterminate age (76 men and 69 women), and 30 were children under 12 years. All were patients in the medical or paediatric wards except 11 who were members of medical or nursing staff.

Injections of 0.1 ml. of histoplasmin equivalent to a 1/100 concentration were made into the volar aspect of the forearm, care being taken to avoid any possibility of contamination with tuberculin, and results were read three days later. Lesions with induration 5 mm. or more in diameter were counted as positive reactions; these were found in 11 individuals (6.3%). In about 10% of the total there were similar reactions measuring less than 5 mm.

Ten of the 11 patients who had positive histoplasmin reactions were examined for calcification in the lungs by chest *x*-ray examination, and for tuberculous infection by Mantoux tests. The results, shown in the diagram, indicate

Diagram Showing Results of Chest X-ray Examinations and Tuberculin Tests in 11 Histoplasmin-positive Cases



that all patients with pulmonary calcification had evidence of past or present tuberculous infection. In five cases the calcium was in the hilar glands; in one it was in the lung parenchyma at the right base.

Of our 11 histoplasmin-positive patients, 8 were men, 2 were women, and 1 was a child (giving incidences of 10.5% in men, 3% in women, and 3.3% in children). These observations suggest that histoplasmosis will probably not be found commonly in Uganda, but may have to be taken into account in considering the aetiology of unusual pulmonary infiltration and calcification. A probable example of such a case was seen at Mulago Hospital in 1951 and 1952.

An African student, an Acholi from North Uganda, was found to have some abnormal shadows in the lungs on routine *x*-ray examination. He had no symptoms or abnormal signs referable to the lungs, and no history of any chest disease; his physique and general health were excellent. Gastric resting juice was examined on four occasions for acid-fast bacilli and none was found. The abnormal *x*-ray appearances consisted of small mottled shadows, fairly sharply defined in places, scattered over both bases and mid-zones, more marked on the left; several showed a strong suspicion of calcification. These shadows were watched over a period of ten months and showed no change. After this he proceeded to the U.S.A. for higher studies, and while he was there investigation of histoplasmin sensitivity in Uganda raised the possibility of his having this condition. Contact with Dr. R. A. Snyder produced this report:

"We had been thinking along the lines of histoplasmosis . . . . and had done skin tests for histoplasmosis and coccidioidomycosis in October, 1953, with negative results. Following your letter, I repeated the histoplasmin skin tests and must report the result as rather equivocal. In other words, there seemed to be no angry reddening of the skin, but there was a definite swelling about 1 cm. in diameter, and I believe that I would interpret the test as mildly positive. We, here at Northwestern University, see a fair number of students each year with healed histoplasmosis. The usual *x*-ray finding is one of scattered small hard calcifications throughout both lung fields, but we have seen some cases with *x* rays that resemble this patient's."

Summary

Histoplasmin skin tests were performed on 175 native Africans in Uganda, with positive results in about 10% of men and about 3% of women and children. Pulmonary or hilar calcification was seen in 6 of 10 patients with positive reactions, but in five of them tuberculin tests were also positive and the sixth had active tuberculosis.

A case of probable pulmonary histoplasmosis is briefly described.

Our thanks are due to Professor Arthur Williams, Dr. H. C. Trowell, and Dr. P. W. Hutton for providing us with facilities for carrying out these tests at Mulago Hospital, and to Professor Francis Schwentker, Johns Hopkins Hospital, for supplying the histoplasmin. We are grateful also to Dr. R. A. Snyder, of the Student Health Service, Northwestern University, Illinois, for his report on the subsequent course of the patient earlier studied by Professor Williams.

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The seventh series of the *Scottish Chemists' Index of Modern Remedies*, recently published, lists about 3,000 proprietary and other preparations. A vitamin mineral chart has been added to facilitate the location of products containing vitamins and minerals in the proportions required, and the list of antibiotics has been much expanded. The *Index* may be obtained from Messrs. H. K. Lewis and Co., Ltd., 136, Gower Street, London, W.C.1, price 7s. 6d.

EXFOLIATIVE DERMATITIS AFTER ACETARSOL VAGINAL PESSARIES

BY

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Acetarsol vaginal pessaries have been used for almost twenty years since the trichomonicidal action of vaginal insufflation of 12.5% acetarsol in an inert powder base was demonstrated by Gellhorn (1933). Several regimes are at present employed, all involving the vaginal insertion of up to six pessaries daily for up to several months, continuing throughout menstruation, and combined with occasional douches. Originally this treatment was reserved for trichomonal vaginitis, but nowadays any vaginal discharge causing symptoms may receive acetarsol therapy.

Each pessary contains 4 gr. (approximately 250 mg.) of the pentavalent organic arsenical compound acetarsol, of which the arsenic content is about 27%. Acetarsol is insoluble in water and dilute acids at body temperature; it does, however, dissolve in the alkaline discharge so often found in the diseased vagina where formation of lactic acid is defective. It is believed that absorption of the dissolved acetarsol through the vaginal mucosa is possible, and the following case is illustrative of one type of toxic manifestation so produced.

Case Report

The patient, aged 47, had had a vaginal discharge for about twenty years. She had menopausal flushes and suffered from metrorrhagia. No abnormality was detected in her cervix or uterus, there was no glycosuria or albuminuria, and her vaginal discharge contained moderate numbers of trichomonads. There was no personal or family history of skin trouble or allergy, and she had not received any organic arsenical treatment previously so far as she was aware.

On November 25, 1953, she began inserting two acetarsol vaginal pessaries high up into her vagina, and continued this practice nightly, with occasional morning douches, until the onset of her menstrual period, which lasted for a week from December 9. When bleeding had stopped she resumed the insertion of two pessaries nightly. On December 20, almost four weeks after beginning treatment, she felt an intense irritation of her hands and noticed that her face, forearms, and feet were swollen. An extremely itchy, red maculopapular eruption appeared on her face and chin, spreading over the following day or so to involve her whole body. During the next two days vesiculation appeared, especially in the flexures, followed by exfoliation and the production of raw, red, weeping areas on her limbs, neck, and abdomen.

The oedema of her face and forearms had subsided by December 26, when she was instructed to discontinue inserting the pessaries. Mepyramine maleate ("anthisan") was given for two weeks without beneficial effect, and her general condition continued to deteriorate in spite of bland local applications.

She was admitted to hospital on January 14, 1954, presenting the picture of an acute exfoliative dermatitis. Her temperature was normal on admission. Injections of dimercaprol ("BAL"), 100 mg. deeply intramuscularly, were given four-hourly for 24 hours, and then eight-hourly for the next 24 hours. During this time her temperature gradually rose and the injections were discontinued when she had developed a pyrexia of 103.2° F. (39.6° C.). She experienced urinary retention, requiring catheterization on the third day in hospital, 40 oz. (1,140 ml.) being drawn off. Difficulty with micturition continued for a couple of days, but otherwise her condition rapidly improved. She was treated locally with frequent applications of ¼% "argyrol" in calamine liniment, and the redness and desquamation of the skin subsided within a week. Ten days after admission she developed tender areas in both thighs where she had received the dimercaprol injections, and her convalescence was delayed by the formation of a deep sterile abscess in each thigh, one of which burst spontaneously, the other requiring incision and drainage. By the end of March her condition had returned to normal except for some residual eczema of both ears.

Discussion

Most gynaecologists and venereologists have met with irritation of the vagina and adjacent skin of the thighs following the treatment of fluor vaginalis with pessaries containing acetarsol. This is a contact dermatitis which responds to routine dermatological measures and cessation of administration of the offending substance. On the other hand, the paucity of literature on the subject in this country would suggest that generalized toxic effects due to vaginal absorption of acetarsol are rare.

Campbell (1937) reported the production of a generalized exfoliative dermatitis and jaundice in a patient who had received four injections of a pentavalent organic arsenical compound. Some ten years afterwards she was treated for a *Trichomonas vaginalis* infection by the insertion of two 4-gr. (260-mg.) acetarsol vaginal pessaries daily for five days. This was followed by a generalized itching erythematous eruption which eventually subsided after desquamation. The probable explanation here is that sufficient organic arsenic was absorbed from the vagina to precipitate toxic effects in a patient previously sensitized to a similar compound. Orchard (1951) described a similar case with slightly different time intervals.

Long (1937) described a case with a generalized irritating papulo-squamous eruption following seven weeks' treatment of chronic vaginitis with one or two 4-gr. (260-mg.) acetarsol vaginal pessaries daily. As the patient had no facilities for douching, he suggested that she had traces of absorbable organic arsenical in her vagina continuously until the medicament was discontinued. He attributed the dermatitis in his case to excessive absorption of pentavalent arsenic and not to any drug sensitivity, and advocated nightly insertion of the pessaries with routine douching each morning.

Crosswell (1951) described a patient who developed angioneurotic oedema and jaundice within a week of beginning acetarsol treatment for a whitish vaginal discharge; treatment with dimercaprol was almost immediately effective. He suggested that drug hypersensitivity following vaginal absorption was the explanation of the production of these conditions, the first insertion sensitizing the patient, and absorption on succeeding days precipitating the reaction.

In the present case, itching and oedema appeared almost four weeks after beginning treatment. It is possible that treatment in the first fortnight constituted the sensitizing dose and resumption of therapy after menstruation the precipitating dose of a drug-hypersensitivity reaction. Then, continued administration and further vaginal absorption of the organic arsenical completed the reaction with the production of exfoliative dermatitis. It is considered that this is a more reasonable explanation than that the dermatitis was due to simple organic arsenical poisoning following vaginal absorption. The oedema was probably secondary to violent epidermal reaction, hence the lack of response to the antihistaminic. The rapid response to dimercaprol, in the absence of any other known heavy metallic cause, confirmed that the exfoliative dermatitis was secondary to absorption of acetarsol. It was unfortunate that the administration of dimercaprol was followed by toxic effects of its own in the form of early hyperpyrexia and acute retention of urine and later development of deep sterile abscesses, but its use was amply justified in a condition which

in all probability would have proved to be more prolonged and dangerous had it not been given.

Estimates of the incidence of *Trichomonas vaginalis* infestation vary, some authorities placing it as high as 50%. It would seem that the question of eradication by potentially dangerous drugs of trichomonads from the vagina in the absence of other gynaecological abnormalities would bear further investigation and discussion. In the case under review, treatment of a long-standing relatively innocuous vaginal discharge caused immeasurably more concern than the original condition could ever have done. If acetarsol treatment is considered essential it is important to heed warning signs of impending toxic vaginal absorption, as continued administration greatly intensifies the resulting reaction, even to the point of endangering life. As in the case of treatment with gold or other heavy metal, the onset of itching during a course of acetarsol vaginal pessaries is an almost certain signal for immediately discontinuing treatment. Whether it is necessary to give a general warning to the patient before treatment is started, as is usually done at the beginning of most courses of heavy metal treatment, is open to debate.

Discussion with several gynaecologists, venereologists, and dermatologists would suggest that, although few cases of dermatitis following acetarsol vaginal treatment have actually been reported, the condition is not as rare as the few descriptions in the literature would have one believe. It is possible that increased specialization of medicine into almost watertight compartments prevents adequate collaboration between the practitioners involved. The gynaecologist may remain unaware of the dermatitis or hepatitis caused by the acetarsol he has recommended; the patient may not consider it necessary or polite to acquaint the dermatologist with the fact that she has been inserting tablets into her vagina; the general practitioner may not know, and may never know, that his patient with an unexplained itch is receiving treatment from a venereologist for a trichomonas infection discovered during investigation or treatment of gonorrhoea; and if a patient does not return to the venereal disease clinic because of a rash the venereologist may never discover that the acetarsol he has prescribed has caused toxic effects.

Summary

A case of exfoliative dermatitis following the administration of acetarsol in the form of vaginal pessaries is described. It is suggested that this was due to induced drug hypersensitivity to acetarsol subsequent to vaginal absorption.

Further toxic effects followed dimercaprol treatment.

A short review of the available literature is given and an attempt to explain the rarity of references is made.

I wish to thank Dr. R. D. Sweet for help in preparing this paper.

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The annual report of the British Standards Institution for 1953–4 states that 286 new and revised standards were issued during the year, and records several thousand projects in hand. A new standard, "Transfusion equipment for medical use," appeared recently, and a standard for components for anaesthetic apparatus is in preparation. Other medical standards in hand deal with bedpans and bedpan washers, forceps of various types, hypodermic syringes and needles, sphygmomanometers, sputum containers, sterilizers, callipers, trusses, and surgical needles. The report, price 5s., is obtainable from the Institution at 2, Park Lane, London, W.1.

Medical Memoranda

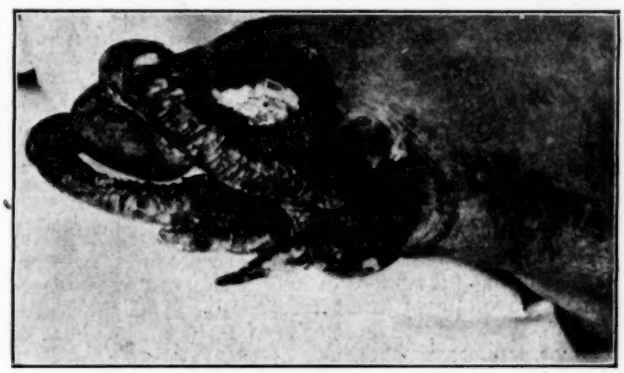
A Case of Onychogryphosis

While onychogryphosis is not a rare condition, especially in older patients, the following case seems to be of such severity as to merit its being put on record.

Case History

I was asked to see a retired engineer, aged 81, with a view to his admission to the geriatric unit at Newcastle General Hospital. He was living by himself in a terrace house, and for some time had been entirely dependent upon his neighbours, as his wife had died some years previously. The house was neglected, dark, and dismal. His complaints were that he felt weak, could not stand upright, had difficulty in walking about, and had frequency of urine with precipitancy. For the past six weeks he had had more difficulty in walking owing to pain in the feet and legs. For a long time he had been unable to go upstairs because his feet hurt.

On proceeding gently to remove his shoes and socks he began to protest, partly because he feared I might hurt him,



but principally owing to shame that "they had not been washed." When shoes and socks had been removed the feet were seen to be grossly ingrained with dirt, the skin of the toes, interdigital spaces, and the dorsum of the feet for about half an inch (1.3 cm.) from the base of the toes were covered with thick, black adherent scales. The nails were, however, the most remarkable features. All were grossly thickened, curved in the typical ram's-horn shape, yellowish brown, and transversely ridged (see Fig.). (The nail of the fourth right toe, which was 6½ in. (16.5 cm.) long, had broken off before the picture was taken.)

The patient was admitted to hospital and the toenails were avulsed under a general anaesthetic, in two stages, at 10 days' interval, on account of the fear that with his feeble circulation gangrene might follow. Fortunately no complications were encountered, and the toes healed well. He also had ankylosing spondylitis and osteoarthritis of the hips, knees, ankles, and feet.

After the toes had healed he was given physiotherapy and walking exercises. At first he was unable to walk owing to some spasticity of the legs. In placing his feet to the ground he did so in almost complete inversion, and with his stooping gait his stance was very like that of an orang-outang. With encouragement and persistence he gradually became able to walk, and was discharged home after 13 weeks, to come up for regular chiropody and review. When seen three weeks later he was walking quite well and the nails had fully re-formed—not thickened, but showing some transverse ridging. He is being kept under observation.

Comment

The cause of onychauxis, or onychogryphosis—the two terms are apparently used for the same condition, the only

difference being the degree of severity—is put down as a subungual hyperkeratosis, a disturbance of the nail-bed (Swanker, 1948).

Various exciting causes have been blamed, from severe trauma—" Ostler's toes," or more chronic injury due to too short shoes—to peripheral neuritis, syphilis, tabes, leprosy, ichthyosis, hemiplegia, and heart disease with peripheral stasis. Even heredity has been blamed, especially in conjunction with dental deformities and hypertrichosis. In other cases no apparent cause except neglect, dirt, and senility has been found. The condition is rare before middle age.

When the condition is severe, treatment is mechanical removal of the deformed nails, though often they grow again in the same deformed manner, and the nail-bed may have to be excised. The provision of properly fitting shoes, cleanliness, and regular chiropody help to control the condition.

In the present case, the patient's age and his ankylosing spondylitis and osteoarthritis would account for the neglect, as he was unable to stoop sufficiently to attend to his toe-nails.

I have to thank Dr. T. H. Bates for permission to publish this case, Mr. Strother Stewart for his interest and surgical help, and the University of Durham for the photograph.

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Encephalitis in an Infant after Vaccination with 17 D Yellow Fever Virus

The first yellow fever vaccinations were done with the French neurotropic strain of the virus, produced by serial passage through the brains of mice. This vaccine produced a high proportion of severe reactions involving the central nervous system unless accompanied by adequate doses of immune serum.

The attenuated 17 D strain was then evolved by passing the virus through tissue cultures of chick embryo from which the nervous tissue had been removed. At first no encephalitic reactions were noticed with this vaccine, even during a large-scale trial carried out in Brazil in 1937. In July, 1941, therefore, it was most surprising to discover cases showing definite signs and symptoms of encephalitis in recently vaccinated persons in an area of Brazil (Fox *et al.*, 1942). These cases were all caused by a particular substrain of 17 D virus—E 718. An experimental vaccination survey was then carried out, using four other substrains, and three of these were found to cause encephalitic signs and symptoms—NY 310, E 750, and E 752, but not to such an extent as E 718. This showed that 17 D substrains could undergo alterations in pathogenicity during passage in embryo tissue cultures away from the parent strain, and suggested that strict limitation of serial passage might lessen the risk of such alterations.

In 1941 the manufacture of 17 D virus was standardized and the " seed-lot " system adopted. This means that the serial passage of substrains is strictly limited, and the secondary seed virus used in the preparation of the vaccine must have passed the " monkey safety test," and thus be free from any increase in viscerotropism or neurotropism. Since the adoption of the seed-lot system in 1942 only five other cases have been reported following vaccination with 17 D virus. Thus, according to Stuart (1954), five cases of meningo-encephalitis have occurred among 1,800 infants less than 1 year old at the Pasteur Institute during 1952–3. All five patients recovered completely. In this connexion it is noteworthy that among 40,000 adults similarly immunized during the same period no case of encephalitis occurred.

The following case occurred recently, and would appear to be the first to follow 17 D vaccination in England.

Case Report

The patient, a baby girl aged 5 weeks, was admitted with convulsions. She had had a yellow fever vaccination 13 days prior to admission. Four days before admission she refused her feeds and whimpered when her back was touched. Two days before admission—that is 11 days after vaccination—twitching started on the right side of the body with eye-rolling. These convulsive seizures occurred at 5 to 10-minute intervals and there was difficulty in waking the baby for her feeds. There was no local reaction at any time. The convulsions became more severe and frequent until admission.

Physical examination showed a well-nourished baby with a temperature of 101.8° F. (38.8° C.). Fits were observed at 10-minute intervals, mainly involving the right side of the body and face. There were some generalized convulsions involving the arms and legs. The anterior fontanelle was tense, but the pupils were equal and reacted to light and there was no papilloedema or paralysis.

Investigations.—The haemoglobin was 96%, the white blood cells numbered 31,000 (polymorphs 59%, lymphocytes 29%). Cold agglutinins showed a titre of 1 in 9. The C.S.F. was clear and colourless and not under pressure; the protein was 90 mg. per 100 ml., with increase in globulin; sugar, 60 mg. per 100 ml.; chlorides, 690 mg. per 100 ml.; cells, 117 (polymorphs 40%, lymphocytes 60%); no acid-fast bacilli were found and there was no growth on culture.

The first day after admission the temperature was still 100–101° F. (37.8–38.3° C.), and the convulsions persisted despite intramuscular sodium amylobarbitone and paraldehyde. All feeds were vomited. Sulphadimidine, 0.25 mg. four-hourly, and penicillin, 20,000 units intramuscularly six-hourly, were started. On the second day the temperature had dropped to 99° F. (37.2° C.), and the convulsions were controlled except when the baby was moved. The fontanelle was bulging and some neck rigidity was present but no papilloedema. A repeated C.S.F. examination showed a similar picture and again no growth on culture. 5,000 units of penicillin and 0.25 mg. of streptomycin were given intrathecally. Later in the day there was sudden collapse and cyanosis probably due to inhalation of vomit. The baby's condition was quickly improved by oxygen and postural drainage. Streptomycin, 0.25 mg. daily intramuscularly, was begun. *X*-ray examination showed an opacity in the left upper lobe. On the third day the temperature was normal, slight twitching occurred only when the baby was disturbed, and the feeds were taken without vomiting. After 10 days the temperature was normal, the chest clear, and only occasional athetoid movements were noted; treatment was stopped. She was discharged after 20 days in hospital apparently quite normal. At a follow-up a month later she was gaining weight and her mother had not noticed any return of symptoms.

Comment

A case of meningo-encephalitis following vaccination with 17 D virus in a baby of 5 weeks has been described. Complete recovery occurred. The vaccine used was derived from vaccine lots sent from the Yellow Fever Laboratory of the Rockefeller Foundation to the Welcome Institute in 1946. There would appear to be two possible explanations of the occurrence of this case: either increased neurotropic affinity of the virus in spite of limited serial passage, or a hypersensitivity to such prophylaxis in small infants which is not found in adults.

I wish to thank Dr. H. R. E. Wallis, paediatrician to the Bath clinical area, for permission to publish this case and for his help and encouragement, and Dr. G. H. Stuart for information and advice.

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Reviews

MEDICAL EDUCATION

Proceedings of the First World Conference on Medical Education. Edited by Dr. Hugh Clegg, with a foreword by Sir Lionel Whitby. (Pp. 804+xvi. £3.) London: Oxford University Press. 1954.

This volume contains some 90 papers which were presented at the First World Conference on Medical Education in London in August, 1953, together with brief reports of the discussions. Apart from the opening and concluding addresses, they are divided into four groups—requirements for entry into medical schools, aims and content of the medical curriculum, techniques and methods of medical education, and preventive and social medicine. Although the individual papers differ in quality, the subject as a whole is very adequately covered, which is a tribute to the planning committee, and the book will remain a quarry of information on medical education for many years to come. Indeed, when student selection and educational techniques are seen in perspective, it seems doubtful whether there is a great deal more that can be usefully said about them, at any rate at the level of a world conference.

The book is not free from a certain amount of fashionable error and distortion, such as the statement that there are no diseases, only people. Presumably a conference of rickettsiae would say there are no infections, only micro-organisms. Surely one of the important differences between man and his parasites is that man has acquired the power to think in terms of abstractions such as diseases. The statement that " of the environmental factors in health, the psycho-sociological ones are far more important even than the material " is hardly appropriate at a meeting of the World Medical Association, for half the population of the world is suffering from undernutrition, infection still accounts for more than 50% of deaths, and the cause of cancer and the common degenerative diseases is obscure—unless, of course, unchecked fertility is counted as a psychosociological factor. There is also the usual condemnation of mechanical aids to diagnosis, which suggests that the speaker is out of touch with a generation that is growing up with television, radioactive isotopes, and jet propulsion.

The conference nevertheless revealed some of the unsolved major problems of medical education. The first is that knowledge grows by geometrical progression, and this is reflected in the progressive lengthening of the curriculum, very prettily illustrated in a diagram by Oliver Cope. In 1850 formal medical education at Harvard was encompassed in one academic year; to-day it takes 14 years to become a surgeon, and at this rate it will take 18 years in 1970. A second major problem is that the Welfare State, national health services, the creation of specialties, and other features of our time are all designed to produce the best service for the patient, and not the best *milieu* for the teaching of medicine. One speaker appositely quotes Toynbee: " The evidence, so far as it goes, suggests that an increasing command over environments is a concomitant of disintegration rather than of growth." Finally, it should be noted that local circumstances differ enormously and medical education must be adapted to them and not considered *in vacuo*. What is appropriate to the U.S.A., where there is still a large enough indigent population for charitable enterprise to supplement private enterprise, is not necessarily applicable to Great Britain, where everyone has a right to medical attention.

When it came to deciding what should be done, the Conference was perhaps less helpful. Few had the courage to say, with Howarth of Winchester College, " Most of us . . . believe in this specialization because we place no reliance on a superficial dabbling in a great variety of subjects." Some methods of reducing the load were nevertheless mentioned, such as the integration of the various branches of chemistry and the combined teaching of anatomy and physiology, medicine and surgery. Any great advance in this direction would mean that teaching hospitals would have to differentiate themselves from key hospitals and regional centres, for the specific function of teaching, in a way they are not yet prepared to follow. It is clear, too, that opinions differ about the teaching of general practice. Should it be taught at all to undergraduates if less than half of them will end up in general practice ? And, if it should be taught because it is the most vital part of medicine, because it is the best way of teaching psychological and social medicine, and because social conditions demand that only those patients are admitted to the hospital who cannot well be given adequate treatment in the home, then how should it be taught ? If it is to be taught at a university level, and if it is to be given vitality by research, as university teaching must be, will it not need subsidized practices such as are now being developed for this purpose in Edinburgh and North America ?

The trouble about conferences on medical education is that they produce far too many thoughts and not enough experiments. We want more pilot schemes and new model schools, and less talk. Developments in medical education in Great Britain have been retarded by undue satisfaction with the ward round and the out-patient teaching clinic, which were invented in conditions which were a hundred years different from to-day. The only widespread post-war change has been the establishment of departments of social medicine, which have not been a complete success so far as the teaching of students is concerned and which have added yet another subject to the curriculum. We have to look to the United States for thoroughgoing attempts to bring medical education up to date, such as the full-time teaching hospital at the University of Chicago, the institution of teaching in the home by the Medical College of Virginia and in Boston, and the drastic reintegration of the whole curriculum at Western Reserve. It is to be hoped that when the next world conference on medical education comes in 1958 we shall have begun to move from the world of Astley Cooper and Osler to the world of Beveridge and Bevan and from hypotheses to reports of trials. In conclusion it should be stated that this book runs to over 800 pages, and is well produced, with informative summaries of the papers in English, French, and Spanish and a useful index. Dr. Clegg and his colleagues are to be congratulated on having got it through the press in a relatively short time and in a very readable form.

L. J. Witts.

VITAMINS

Vitamins in Nutrition and Health. By Audrey Z. Baker, B.Sc., M.R.C.S., L.R.C.P. (Pp. 147+xii. 12s. 6d.) London and New York: Staples Press. 1954.

To be successful in condensing our knowledge of all the vitamins into a single short volume the author must show sound judgment in picking out the salient facts which will interest and instruct his intended readers. Dr. Baker has written mainly for teachers and students of domestic science, nurses, health visitors, and others concerned in the planning of meals, but she hopes also to interest the practising doctor. Her treatment of the subject makes attractive reading, and provides a clear picture of the central facts about the vitamins without going too deeply into either their chemistry or the pathological defects of deficiency. Thus the structural formulae of all the vitamins are shown, but the reader is not burdened with a discussion of what is known of their role in biochemical systems. The gross effects of vitamin deficiencies are usually described without reference to the underlying histological changes.

The book starts with an early history of the vitamins, with particular reference to scurvy, but later the author proves that she can be equally informative in discussing all the most recent developments. A chapter on " Activities and Interactions," which groups together vitamins that appear to be related in their functions, is obviously based on a wide knowledge of recent literature. Dietetic aspects are admirably treated in a series of food tables and in chapters

on human needs for vitamins, sources of vitamins, and the planning of meals. There are numerous diagrams and photographs, many of which show the effects of vitamin deficiencies in man and animals. A small error occurs in the statement that the estimation of vitamin A by the spectroscopic method depends on the antimony trichloride reaction; actually this method is based on ultraviolet absorption. Perhaps it is inevitable, for reasons of brevity, that the citation of references to reviews should sometimes give the reviewers false credit for important discoveries. Thus Wald's proof that visual purple contains vitamin A is credited to the author of a book written many years later.

T. Moore.

OBSESSIONAL NEUROSIS

The Analysis of an Obsessional. By R. W. Pickford, M.A., Ph.D., D.Litt. Foreword by Angus MacNiven, M.B., Ch.B. (Pp. 234+ix. 21s.) London: The Hogarth Press. 1954.

This full-length book written by the senior lecturer in psychology in the University of Glasgow describes in detail the therapeutic psycho-analysis of a patient suffering from a severe obsessional neurosis. There is a short chapter on general principles, and the rest of the book is devoted to the description of the free associations elicited during eighty treatment sessions and to the analysis of abundant dream material. This material is used to illustrate theoretical interpretations which are interpolated as they become relevant. The treatment of the resistance is dealt with fairly fully, as is the author's method of handling the transference situation. The need for impartiality on the part of the analyst is repeatedly stressed. Much of the material is of a bizarre sexual nature, and it is regrettable that the author does not anywhere demonstrate a relationship between these fantasies and the patient's symptomatology and recovery. The book is useful because it illustrates well the foundations on which much of the Freudian theoretical superstructure is built.

Alick Elithorn.

CLINICAL ORTHOPAEDICS

Clinical Orthopaedics. Nos. 2 and 3. Edited by Anthony F. De Palma. (No. 2. Pp. 247; illustrated. 48s. No. 3. Pp. 230+viii; illustrated. 60s.) Philadelphia, London, and Montreal: J. B. Lippincott. No. 2, 1953; No. 3, 1954.

These are the second and third volumes in symposium form produced under the auspices of the Association of Bone and Joint Surgeons (of America). The first volume, published in 1953 and entitled *Pediatric Orthopaedics*, was well received. Three further volumes are named in the programme.

In each of these books H. Winnett Orr writes words of wisdom: firstly, in tracing the development of fracture treatment during one hundred years he indicates those responsible for advance and how attempts at "advance" may be marred by poor imitators; secondly, in writing a concise review of much of the surgery of the patella, he makes it clear that excision of this bone has a limited place in operative surgery.

The greater part of Volume 2 is a series of articles, each by a different surgeon, on intramedullary nailing. Nearly every aspect of this method of treating fractures is discussed, together with the complications. It would appear that the writers are enthusiasts in obtaining anatomical alignment and in internal fixation, not only in fresh fractures and in delayed union and non-union, but also in the treatment of pathological fractures. Contemplation of these chapters will make any reader wonder if he has been convinced that intramedullary nailing is a method which has come to stay or whether it is a passing fashion. McElvenny's reflections are interesting in that he urges his junior colleagues to become skilled in the "neglected art of traction and casting" and insists that the gadget should be used as an aid to Nature.

Section II deals with general orthopaedics and contains short articles on conditions which are recognized as difficult to understand or have failed to respond to such treatments as have been devised. The gross pathology of certain types of arthritis is described and well illustrated. Of the other eight chapters, those on osteoid osteoma and congenital metatarsal varus will attract most attention. The former is concise and includes a report on five cases with excellent illustrations. The latter is a brief report on 267 patients examined and treated over a seven-year period. Another method of fusion of the ankle-joint and a surgical correction of one type of flat foot form other subjects which will be read with interest and incite criticism.

In Section I of Volume 3 there are concise articles on soft-tissue lesions around the knee (including those affecting ligaments, cartilages, and the patella), on certain conditions of the shoulder, and one on the hip and one on the ankle. Some thirty pages are devoted to the effects of trauma on the soft parts of the knee-joint. These are interesting and the illustrations depicting methods of examination are useful. Some other figures are of little value, and a surgeon doing clinical work requires more information than is contained in these chapters, which should be considered as accessory to other reading on the joint. The chapter on bicipital tenosynovitis and that on ruptures of the rotator cuff are lucid. The diagnosis and treatment of such conditions around the shoulder are well established, and the reader will be unlikely to find such authoritative writing elsewhere.

In Section II, devoted to general orthopaedics, there is an attractive article on giant-cell tumour of bone by Herrick and Kazal, of Jefferson Medical College and Hospital. The differential diagnosis is well set out. There are a number of short monographs, and an original contribution on vascular relations of the ankle and their clinical significance which deserves attention.

The value of these volumes is enhanced by the standard set by the publishers in print and figures.

St. J. D. Buxton.

FIRST AID IN EMERGENCIES

First Aid and Resuscitation. By Lieutenant Carl B. Young, jun. (Pp. 338; 16 illustrations. 61s.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1954.

Lieutenant Young, formerly Assistant Director of Harris County Emergency Corps, Texas, has written this book for the instruction and guidance of the men in the "Rescue Squads" or "Emergency Squads" which are a feature of the civic service in the larger cities in the United States, and are usually under the administration of the Fire Department. It is far more than a manual of first aid, for it deals with many emergencies that are not usually included in that category, and in each section it gives the scientific basis for the treatment that is recommended, as well as detailed instructions on what should be done. The underlying pathology of "heart attacks," which apparently constitute more than a third of the cases to which the rescue squads are called, the basis of shock, the analysis of the various toxic gases that are formed in the combustion of various industrial substances, the structure and action of the common poisons—all such subjects are discussed sufficiently clearly and fully to give the member of a rescue team an understanding of the work he is called on to do, without encouraging him to become a pseudo-doctor. The author repeatedly insists on two things: that many lives may be saved by correct treatment on the spot before the patient is put in the ambulance, and that, having been put in the ambulance, he may be harmed rather than helped by hurried transport to hospital.

This book will find its chief place as a guide to those called on to give first-aid lectures, and as a reference book. It is very fully illustrated. Two things betray its American origin—the horror photographs of accident, murder, and sudden death, and the frequent reminder that after the accident squad comes the mortician, whose needs must be kept in mind.

Heneage Ogilvie.

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THE INDUCTION OF LABOUR

In a sizable proportion of pregnancies, and excluding the convenience of patient or attendant, there comes a time when the obstetrician feels that labour should be induced in the interests of mother or foetus, or both. The timing of such intervention calls for good clinical judgment. Premature interference may not only offer an extra and unnecessary hazard for the mother but also prejudice the survival of a small baby; procrastination may be penalized by intrauterine death or by loss of the foetus in or soon after labour. Nevertheless, impressed by the increasing safety of lower-segment caesarean section and fortified by the efficiency of antibiotics in the prevention and treatment of sepsis, more obstetricians are widening their indications for the induction of labour. The method of general choice for induction is artificial rupture of the membranes, and on p. 833 of this *Journal* Dr. R. A. Tennent and Mr. M. D. Black review 1,585 pregnancies in which amniotomy was performed in the years 1950–2. These cases represent 18.3% of all deliveries in their hospitals in Lanarkshire during that time, an incidence double that of Gibson,[1] who considered his rate in Belfast notably high. But Tennent and Black believe that their practice is justifiable, for it results in a low foetal mortality without maternal risk and with a reduction in their caesarean section rate.

Their indications for intervention were mainly three. First and foremost, prolongation of pregnancy beyond the 41st week was the indication for 4 out of every 10 inductions. Gibson induced labour because of postmaturity in only 12 of his 843 cases, but the practice of Tennent and Black might be considered more in accord with the results of recent research, academic and clinical, on the perils of prolonged pregnancy.[2,3] The corrected foetal mortality in these cases was 1%, and the caesarean section rate about the same. Some would go further and suggest that, if amniotomy for postmaturity produces no liquor at all or merely a small amount of "pea soup," immediate section is advisable in the interests of the baby. Hypertensive toxaemia provided the indication for 3 out of every 10 inductions, but here the overall corrected foetal mortality was 4%, and in 106 cases induced before 38 weeks it was over 15%. This higher foetal loss is related to a greater proportion of cases in which labour did not start within 72 hours of amniotomy. It would seem, therefore, as pointed out by Hamilton[4] and confirmed by Patrick,[5] that elective caesarean section offers the best hope of survival when a small baby must be delivered from a toxaemic mother.

The third leading indication was contracted pelvis, and here Tennent and Black have the support of Dr. H. R. MacLennan, who on p. 837 of this issue makes a plea for "trial induction" in these cases—that is, for premature induction followed by a trial of labour, with vaginal delivery the goal but with recourse to abdominal section if conditions become unfavourable. These authors all agree that the ideal time for induction in contracted pelvis is when the foetus is not too large for easy vaginal delivery but not too small to prejudice its survival, usually about the 38th week. Yet it is admitted that even with careful assessment the risk of the birth of an unduly small baby is a real one. Dr. MacLennan points out that major degrees of contraction are becoming rare and claims that for minor degrees the induction of premature labour is preferable to the possibility of an elective section later. Nevertheless, he quotes a section rate of 21% in one series after trial induction, while Tennent and Black had recourse to abdominal delivery in 10% even though they induced only when there was no disproportion bimanually. It seems likely, therefore, that criticism will continue to be offered against inducing premature labour for contraction of the pelvis. As Dewar[6] puts it, the earlier the induction the greater the foetal risk, and the later the induction the less it is justified. Under similar circumstances to those quoted in these papers, most obstetricians will continue to believe that trial of labour at term, when the baby is more fitted to extrauterine life, entails no higher proportion of abdominal deliveries; for, while a degree of disproportion may be more frequently met at term, good uterine action may also be more likely then than earlier.

Nor is the surgical induction of labour devoid of risk. Evans[7] has recently described the possible hazards, but he has perhaps obscured the picture as it is to-day by starting his review as far back as 1928, before the days of chemotherapy and antibiotics. Moreover, in nearly 40% of his cases methods of

[1] *J. Obstet. Gynaec. Brit. Emp.*, 1952, **59**, 814.
[2] Racker, D., *et al*. *Lancet*, 1953, **2**, 953.
[3] Walker, J. *J. Obstet Gynaec. Brit. Emp.*, 1954, **61**, 162.
[4] Ibid., 1949, **56**, 413.
[5] *British Medical Journal*, 1954, **2**, 164.
[6] Ibid., 1954, **2**, 163.
[7] *Lancet*, 1954, **2**, 564.
[8] Bender, S., *J. Obstet. Gynaec. Brit. Emp.*, 1953, **60**, 508.
[9] Torrey, W. E., *Amer. J Obstet. Gynec.*, 1952, **63** 146.
[10] Mauzy, C. H., and Donnelly, J. F., ibid., 1952, **64**, 517.
[11] Parker, J. C., and Roberts, L. W., ibid., 1954, **68**, 518.
[12] Carey, H. M., *J. Obstet. Gynaec. Brit. Emp.*, 1954, **61**, 59.
[13] Faris, I. B., and Kahlenberg, B., ibid., 1954, **61**, 96.

induction were used which have generally fallen into discard in the last decade. Apart from the risk of sepsis, which Tennent and Black and MacLennan discount to-day, one danger of induction is separation of a low-lying placenta by a Drew Smythe catheter. This complication could be avoided by preliminary placentography.[8] Evans noted prolapse of the cord in 3.3% of inductions, with a foetal loss of 50%. Gibson,[1] in his more recent series, found an incidence of 0.6% in 843 cases, while Tennent and Black report only one cord prolapse in their 1,585 cases—a surprisingly low incidence when it is noted that they ruptured the membranes regardless of whether the head was fixed or free. Another but uncommon risk to the baby, apparently not encountered by any of these authors, is bleeding due to rupture of vasa praevia at the time of induction.[9]

These various risks, although admittedly uncommon and perhaps justifiably taken when continuation of the pregnancy jeopardizes mother or baby or both, provide an incentive to seek better methods of induction. In this connexion it is encouraging to read of the success which has been obtained by the cautious use of "pitocin" by intravenous drip, alone or in combination with amniotomy.[10-13] The particular merit of pitocin may lie in the possibility of its "ripening" the cervix, for it is an unfortunate fact that induction is often most strongly indicated when the conditions for its safe employment—a low head and a ripe cervix—are not fulfilled.

PSORIASIS

Perhaps the most surprising thing about psoriasis is that there has been so little positive advance in knowledge and understanding of the disease in the last few decades. In the past the theories which have held sway have owed their popularity mainly to the fact that they could not be disproved. The theories which ascribed the skin changes to remote foci of sepsis or to systemic metabolic and biochemical upsets have been discarded as methods of investigation have improved, leaving little room for vague hypotheses. In his Watson-Smith lecture, published in the opening pages of this issue of the *Journal*, Dr. J. T. Ingram has restated the problem in modern terminology, but the essential cause of the disorder remains as elusive as ever. It has long been appreciated, for example, that environmental influences have a good deal to do with the onset of psoriasis, and in individual patients a variety of apparently precipitating causes can be recognized. The essential determining cause—the reason why an emotional shock produces psoriasis in a few people and not in most—is the fundamental factor which much research in the past thirty years or so has completely failed to identify.

Dr. Ingram is to be congratulated on his strong condemnation of a defeatist attitude on the part of doctors and patients. As he himself recognizes, there is a hard core of patients who are extremely difficult to treat and, indeed, may be incurable, but in the great majority the eruption can be removed and a remission of the disease obtained. It is important that this should be done before the disorder has been present for many months; the eruption can be dispelled comparatively easily soon after its onset, and the remission thus obtained may last for many years. On the other hand, the inveterate case responds to treatment with greater difficulty and is likely to relapse much sooner. This applies perhaps particularly to children, in whom prompt and efficient treatment may make the difference between a good and bad prognosis for the rest of the child's life. Individual patterns of psoriasis vary widely, and if relapse occurs soon after a successful treatment it usually has to be recognized that it will do so again if treatment is repeated. For these patients it is at the present time necessary for them to accept the fact of their psoriasis and to adapt their lives to it as best they may.

It is the local treatment of psoriasis that is all important, and, although constitutional factors are sometimes much discussed, the emphasis remains with the application of ointments—no dermatologist would expect to clear up the eruption with systemic treatment alone. In most hospitals the practice is for patients with psoriasis to be admitted for their treatment, since the facilities and organization for daily out-patient treatment are not easily arranged. Rest in bed, also, often makes a considerable contribution to the success of therapy, and the liberal use of dithranol ointments in ambulant patients may cause embarrassment both to the patient and those with whom he comes in contact. Whether or not the ambulant treatment which Dr. Ingram describes enables his patients to continue at work during the period of their treatment, it at least effects a saving of hospital beds without apparently any notable loss in efficiency. Whichever method is adopted this much is clear: the treatment of psoriasis entails the thorough and liberal use of ointments, most of which are objectionable by reason of their staining properties and of their smell. It is not usually reasonable to expect a patient to carry this out efficiently by himself at home; such treatment leads to half measures

and is almost certain to fail, so that both the patient and the doctor are discouraged from further efforts. If, on the other hand, a determined and optimistic attitude is taken from the very onset of the disorder, its inconveniences will be minimized and its whole course throughout the patient's life will probably be greatly lessened in severity.

COMPOSTING WASTE MATERIALS

The process of composting can most conveniently be regarded as the decomposition of organic residues from either plant or animal wastes by a mixed bacterial and fungal flora to give a product which is useful as a manure. It is generally carried out under conditions which are initially aerobic and in a medium which is neutral or alkaline. Anaerobic conditions retard decomposition, particularly of the carbohydrates present in plant residues, and result in an acid and evil-smelling product. There are no great differences between composts and farmyard manure, except that the latter may be used in a strawy condition direct from cattle stalls or stables; when it is stored in heaps, however, the changes which take place are similar to those in composts.

The changes in chemical composition brought about by micro-organisms during composting depend on many factors, particularly on the chemical nature of the materials present, the degree of aeration of the heaps, and the length of time for which decomposition proceeds.[1] In the first stages microbial action is very rapid and the temperature may rise to 65° C. Thermophilic bacteria and actinomycetes produce much ammonia as a result of breakdown of the proteins in the plant or animal residues; this ammonia may be lost by evaporation or resynthesized into microbial protein. During this stage the hemicelluloses and cellulose originally present are largely decomposed and the compost becomes progressively richer in lignin, ash, and, usually, in protein. The total loss of organic matter in three months is about 40–50%. Microbial processes then slow down, and some of the synthesized microbial protein is decomposed to give water-soluble nitrogen compounds, which are present in composts largely as ammonia and nitrate nitrogen. Like farmyard manure, composts also contain phosphorus and potassium compounds and some calcium and magnesium salts, the amounts depending on the composition of the materials used for composting.

The quantity of nitrogen in these materials is the major single factor determining how rapidly decomposition proceeds to give a product which can be used as a manure.[2] It is seldom necessary to inoculate waste materials to achieve rapid decomposition; most plant or animal wastes carry their own bacterial flora, which can multiply rapidly under suitable conditions of moisture and aeration. However, to ensure that adequate nitrogen is present for the early stage of rapid microbial growth, it is often added in the form of animal faeces, ammonium salts, calcium cyanamide, dried blood, or sewage sludge to materials such as cereal straw. Addition of phosphate is seldom necessary in composting; but phosphoric acid or superphosphate is sometimes added to farmyard manure to reduce loss of ammonia by evaporation.

A considerable amount of work has been carried out in recent years on composting habitation wastes: town refuse can be composted alone, generally after removing some inert materials by salvaging, or the refuse can be mixed with sewage sludge and composted.[3,4] The former method has been carried out on a large scale in Holland for some years, while in Britain compost is made from refuse and sewage sludge in several small plants. In Jersey a new plant is being built which will make compost from refuse, sewage sludge, and seaweed. Wartime experiments also showed that a useful compost could be prepared on farms from sewage sludge and straw mixed in the ratio of approximately 1½ parts of dry sludge to 1 part of straw. Such composts have proved a useful alternative to farmyard manure.[3]

Refuse and sewage sludges can also be used alone as organic manures. Refuse varies considerably in manurial value, largely in accordance with the percentage of organic waste present. It is generally deficient in nitrogen, and has given yields in field experiments equivalent to between one-third and two-thirds of those from farmyard manure; it is of value in improving the physical structure of heavy soils.[5] Sewage sludges have little effect on soil structure; they contain useful amounts of nitrogen, especially sludges from activated-sludge plants, and some phosphate. But all sludges are deficient in potassium salts, which are largely lost in sewage effluent. Composts of sludge and refuse contain more nitrogen than the refuse alone; composts of sludge and straw contain more potassium salts than the sludge and possess some of the physical properties of farmyard manure. Such composts are easy to handle and inoffensive to use.

[1] Waksman, S. A., *Humus*, 2nd ed., 1938, London.
[2] Hutchinson, H. B., and Richards, E. H., *J. Minist. Agric.*, 1921, **28**, 398.
[3] *Ministry of Agriculture and Fisheries Tech. Comm. No. 7*, 1948, "The Agricultural Use of Sewage Sludge and Sludge Composts."
[4] *University of California, Sanitary Engineering Research Project Tech. Bull. No. 1*, 1950, "Composting for Disposal of Organic Refuse."
[5] *Ministry of Agriculture and Fisheries Bulletin No. 36*, 1952, "Manures and Fertilizers," London.
[6] Natural Resources (Technical) Committee, *The Use of Towns' Wastes in Agriculture*," 1954, London.

The results of a series of field trials comparing composts from sludge and straw, sludge alone, and farmyard manure may be summarized as follows.[3]

Crop	Increase in Yield (Tons/Acre) due to		
	Sludge	Sludge–Straw Compost	Farmyard Manure
Potatoes	1·5	2·9	4·7
Cabbage, red beet, carrots	1·4	1·3	3·0

Heavier crops were obtained in all cases with the organic manures plus artificial fertilizers than from the organic manures alone. Thus yields from sludge–straw composts plus added fertilizers were the same as from farmyard manure plus added fertilizers for vegetable crops, though farmyard manure plus artificial fertilizers still gave heavier yields of potatoes than the compost plus fertilizers.

The quantity of habitation wastes said to be available in the country for composting or direct use in agriculture has often been exaggerated. A recent and detailed survey[6] has shown that about 800,000 tons of dry sewage sludge are available annually and nearly half is already used in agriculture. Some of the remainder from industrial centres contains toxic wastes and is not suitable for agricultural use. The same report shows that about 700,000 tons of compost could be prepared annually by composting the putrescible part of household refuse with sewage sludge. But this quantity is small compared with the 35–40 million tons of farmyard manure which are still used annually in Britain.[5] No cases of typhoid or dysentery have been traced in Britain to the use of sewage wastes in agriculture. It has been recommended, however, that sewage sludges should not be applied to salad crops.[3]

MINERS' NYSTAGMUS

The remarkable change in the incidence of new cases of miners' nystagmus was a subject of discussion this year at the annual meeting of the Ophthalmological Society. From the evidence the speakers put forward it seems that fluctuations in incidence during the last 25 years have not been a reflection of social or of economic conditions, but mainly of stress of work. There was, for instance, a marked increase in the number of miners who sought certification during the later years of both wars.[1] One of the factors which has contributed to the decline in miners' nystagmus during the last few years is the improvement in the lighting of mines, which has not only made it possible for the miner to make greater use of his central vision but has also relieved him of the uncertainties and hazards of working in darkness.[1] Indeed the number of new cases and the number of miners who can be found with oscillations are now so diminished as to suggest that the disease is disappearing. If so, it will vanish from our clinical experience before we have arrived at a satisfactory estimate of its organic and psychological causes.

Since the first psychological analysis carried out by Culpin[2] there has been abundant evidence—including the report of an investigation by Professor R. C. Browne and Miss I. F. Beck,[3] recently published in this *Journal*—that miners' nystagmus is not primarily a psychiatric disorder. This is particularly true of the cases with active oscillations. Haycraft,[4] Tudor Thomas,[5] and many other experienced ophthalmologists have given evidence of the good mental calibre of the miners who seek certification. The fact that the oscillations arise from working in illumination which is below the threshold level for the human retina is substantiated by the experiments of Browne and others,[6] who produced rotary oscillations in animals by keeping them in the dark. Oscillations alone do not prevent a miner from continuing to work on the coal-face, and he develops a natural method of controlling them, at least momentarily, by rotating or tilting his head or by extreme lateral deviation of his eyes.[7] His ultimate breakdown is determined either by the failure of these compensatory reactions, by accident or ill-health, or by the mental and physical instability caused by the almost continuous movement of objects in his vision. The mental anxieties and fears to which every miner is exposed by virtue of the nature of his occupation have been well described by Stern.[8] These fears must in some cases precipitate the breakdown of the miner suffering from nystagmus and delay his subsequent recovery.[9] The value of a psychiatric examination in miners' nystagmus should not therefore be underestimated. Those with experience in treating the chronic cases of miners' nystagmus know that poor homes and domestic illness or difficulty are often the basic factors which prevent recovery.

The certification of patients without oscillations was the subject of inquiry by a special committee appointed by the British Medical Association in 1936. The committee's report[10] emphasized the fact that "any symptom of neurosis exhibited by a miner suffering from nystagmus presents nothing peculiar to his calling . . . and cannot be differentiated from the general class of psychoneurosis in industry," but "the particularity of the sign of nystagmus to the occupation of the miner does mark the disability as peculiar to miners": and the recommendation was made that "cases should not therefore be certified as miners' nystagmus unless definite oscillations of the eyes can be detected." Unfortunately this recommendation was not implemented, with the inevitable result that those certified without oscillations have included a high proportion of men with genuine psychiatric disorders and with other forms of visual defect.[1]

[1] *Trans. ophthal. Soc. U.K.*, 1954, in press.
[2] Culpin, M., *Spec. Rep. Ser. med. Res. Coun. (Lond.)*, 1932, No. 176.
[3] *British Medical Journal*, 1954, **1**, 1176.
[4] *Trans. ophthal. Soc. U.K.*, 1939, **59**, 790.
[5] *J. industr. Hyg.*, 1930, **12**, 1.
[6] *Lancet*, 1951, **1**, 721.
[7] Campbell, D. A., Harrison, R., and Vertigen, J., *Brit. J. Ophthal.*, 1951, **35**, 488.
[8] Ibid., 1948, **32**, 209; 1950, **34**, 385.
[9] Caiger, H., *Med. Press*, 1941, **206**, 152.
[10] *British Medical Journal, Supplement*, 1936, **1**, 238.
[11] *v. Graefe's Arch. Ophthal.*, 1952, **152**, 477; 1952, **153**, 321.
[12] *J. Physiol. (Lond.)*, 1953, **119**, 1.

Professor Browne and Miss Beck found a relationship between the development of the disease in susceptible men and working in seams of intermediate height. This is an interesting confirmation of the work of Professor Ohm, who recently published the evidence of a lifetime of observation of the effect of posture on miners' nystagmus.[11] From numerous records of the actual rate of oscillation in individual miners over a number of years he has been able to show that among miners in the Ruhr there has been an average increase in the rate of oscillations of 30 per minute during the years 1914 to 1950. He has found that the frequency rises not only with increased illumination, but after a change in work from low to high seams, and also as the result of mechanization, which relieves postural strain. He regards the oscillations as a disturbance of the normal ocular sensory–motor impulses in which a physiological high rate of frequency is converted to a pathological one of lower rate. He thus links the abnormality of oscillations with the normal processes of vision, in which, according to the work of Ditchburn and others,[12] continuous small movements of the eye muscles occur. Perhaps physiologists will eventually explain the conflict which occurs in miners' nystagmus between visual dominance and the more primitive proprioceptor and vestibular influences.

LIFE IN AN UPSALA HOSPITAL IN 1900

The Swedish Medical Association has recently celebrated the jubilee of its official organ *Svenska Läkartidningen* with a special number. It contains an entertaining account by Professor Gunnar Nyström of life in the Upsala Akademiska Hospital in 1900. This hospital had a palatial façade; Professor Karl Gustaf Lennander was a surgeon with a well-deserved world-wide reputation; and the nurses were the soul of unselfish devotion. But, by to-day's standards, both nurses and patients must have had a hard time, and Lennander himself was worn out at the early age of 50. The nurses' dietary was distinguished by its austerity. For breakfast bacon and potatoes were varied every other day by herrings and potatoes. Every other week there was a meagre ration of cheese and butter, and the nurses had to store their food in a cupboard which also housed the hospital's linen as well as scraps of food belonging to the patients. The midday meal had to be fetched by each nurse from the kitchen, and any nurse late for meals had to dispense with cooked food and satisfy herself with a frugal sandwich. A spirit of economy brooded over the hospital's staff so effectively that in 1900 the bed–day cost was less than half a crown in English currency.

A ward sister had to make good all breakages of china if she could not shift this obligation to the actual breaker. The educational level of the nurses was low, and the hospital authorities thought of them only in terms of labour. The patients were given devoted care by doctors and nurses, but could hardly have been pampered, for they had to share their wards with cockroaches and rats. The former could just be tolerated, but the latter were a real nuisance. In their struggle for survival they not only stole the patients' crusts of bread, but nibbled their fingers. On one occasion Professor Nyström had to dress the fingers of two rat-bitten patients on the same day. A patient troubled by insomnia was solaced by quite good ratting, for he had only to pull a string at the right moment and a booby-trap would crush a rat or two.

Professor Lennander came from a modest home and was less than a year old when his father, an artillery corporal, died of cholera. When he was still at school rheumatic fever left him with valvular disease of the heart, which ultimately ended his life in 1908. He was a terror as well as a hero to his subordinates, and was adored by his patients. After a long day's work his assistants would have to telephone at 10 o'clock in the evening, after he had gone to bed, to let him know how each of his patients fared. The circumstances under which they were admitted to hospital were at times a trifle fortuitous. They would wander about the corridors, asking passers-by where to go and risking admission to the wrong department. A patient misdirected to the medical side of the hospital puzzled the physician in charge. Lennander, summoned in consultation, declared in some exasperation: "Call it what the devil you like, but the whole of the abdomen is full of pus!" In 1897 he published a case, the first of its kind, in which he succeeded in extracting, under radiological control, a revolver bullet which had entered the skull through the left orbit. In the surgical world he was best known for his work on sensation in the abdominal cavity and on acute purulent peritonitis. The substantial fees Lennander charged his well-to-do patients caused some heartburning at the time, but they may have been somewhat consoled when they learnt after his death that he had bequeathed nearly all his fortune to the advancement of natural science, with provisions for yearly lectures on surgery and hygiene.

AMMONIA AND HEPATIC COMA

Ammonia is highly toxic when given to animals, and ammonium compounds normally produced by bacteria in the gastro-intestinal tract are quickly converted by the liver to urea. When liver function is impaired ammonia tends to accumulate, and measurements of blood ammonia by microdiffusion techniques[1] generally show high concentrations in patients with severe liver disease. The concentration tends to rise with the development of hepatic coma, though the correlation is by no means consistent,[2] and it is not yet certain what part ammonia plays in the genesis of this syndrome. It is possible that present methods of measurement are not sufficiently specific, or that some other derivative of ammonia is responsible for the neurological features. Walsh[3] has suggested that intracellular ammonia may

[1] Conway, E. J., and Cooke, R., *Biochem. J.*, 1939, **33**, 457.
[2] Singh, I. D., Barclay, J. A., and Cooke, W. T., *Lancet*, 1954, **1**, 1004.
[3] *Quart. J. Med.*, 1951, **20**, 421.
[4] Riddell, A. G., and McDermott, W. V., *Lancet*, 1954, **1**, 1263.
[5] *New Engl. J. med.*, 1952, **247**, 239.
[6] *J. clin. Invest.*, 1954, **33**, 1.
[7] Matthews, S. A., *Amer. J. Physiol.*, 1922, **59**, 459.

be more important, especially in the brain, where normally glutamic acid combines with ammonia. This is one of the reasons why glutamic acid has been used in the treatment of hepatic coma, and there is some recent evidence that this substance will reduce the blood ammonia, with corresponding clinical improvement.[4]

It is of some practical interest that patients with liver disease cannot tolerate nitrogenous substances. Thus Phillips and his colleagues[5] in Boston have reported impending hepatic coma after the administration of a wide variety of substances, such as dietary protein, urea, ammonium cation exchange resins, and ammonium salts. Patients with liver disease are commonly advised to take a high protein diet, and both resins and ammonium chloride are used in the treatment of portal cirrhosis with ascites: such therapy, though often beneficial, may not be without danger. A similar intolerance can occur when portal blood by-passes a normal liver. McDermott and Adams[6] have described the symptoms of a man with an Eck fistula performed during extensive removal of a carcinoma of the head of the pancreas: he developed episodes of stupor when given nitrogenous compounds. This phenomenon is comparable to the well-known "meat intoxication" of animals with Eck fistulae.[7] High concentrations of blood ammonia have been found in all these conditions.

There are two reasons why blood ammonia may rise in the presence of liver disease: liver-cell function may be inadequate to carry out the necessary conversion to urea; alternatively blood containing ammonia from the intestines may by-pass the liver through the extensive collateral circulation, a state of affairs comparable to the Eck fistula. A few observations[3] on the ammonia concentration of blood obtained from the inferior vena cava and hepatic vein by catheterization have shown very high concentrations in patients with cirrhosis, and similar findings might be expected in patients with extra-hepatic portal hypertension and in those who have undergone portacaval anastomosis. It is probable that hepatic vein catheterization will yield further information on this interesting aspect of liver inadequacy.

DOCTORS' DEFENCE

The recent high tide of medical litigation and the large sums awarded as damages has caused much disquiet. The doctor, of course, has always been at the mercy of litigious patients ever since medico-legal history began. But the present situation has arisen mainly from two causes. The first is that with the nationalization of health services patients feel less compunction in bringing actions against a doctor or a hospital. State ownership tends to make everything belong to everybody, but at the same time it has destroyed the sense of personal belonging—the idea of "my doctor" or "our hospital," which often made an action at law unthinkable to a patient even if he had some ground for complaint.

The other reason is the Legal Aid and Advice Act, 1949, under which persons with income or capital below a certain figure may have representation by solicitor or counsel on little or no payment. The three medical defence or protection societies in their latest annual reports all give 80% as the estimated proportion of actions in which the plaintiff is legally assisted. One of them mentions a case involving eleven days in court and costing £7,700, resulting in a verdict for its member, but with no costs recoverable from the plaintiff, who was legally assisted. A case in Scotland is reported in which again the defending doctor was successful, but the costs incurred in defence amounted to over £1,600, and the claimant, who had the advantage of legal aid, had only £1 to pay—this after a four-day trial in the High Court with the employment of leading counsel and the assistance of expert witnesses.

It is wholesome and right that negligence or breach of duty should incur penalty, but it does not make for good work by the doctor or surgeon if he feels all the time while attending a patient wholly dependent upon his service that presently that patient may confront him in a court of law, without financial risk to the patient himself, and that the issue may be not some negligence on the doctor's part, nor even some excusable error of judgment, but a quite unpredictable and, humanly speaking, unpreventable mishap.

A heavy burden is imposed on the medical defence societies as a result of this spate of claims, though fortunately they have substantial accumulated funds, and their position should be recognized. The two societies with their headquarters in London—the Medical Defence Union and the Medical Protection Society (the old "London and Counties")—have been in existence for between sixty and seventy years, and the Medical and Dental Defence Union of Scotland for over fifty years. Between them they have a membership of doctors and dentists of more than 77,000. They have interposed a shield between the individual doctor and ruinous claims upon his finance and attacks upon his reputation. The work they have done is not to be measured by the cases that have come into court, but rather by the cases that have been prevented from coming. The advice and legal assistance they offer takes an ever wider range as the work of the doctor edges more and more upon the domain of the law. Tribute is due to these organizations for the way in which they have protected the character and interests of the practitioner in circumstances varying from case to case. They may be said to be competitors, but actually they work to a considerable extent together. A recent instance of co-operation has resulted in a change of procedure on the part of the Ministry of Health whereby at least the sorry spectacle will be avoided of a doctor appearing in court as co-defendant with the governing body of a hospital, each seeking to blame the other for damage to the patient. Apart from the cover which they have given to the individual practitioner, they have done much to promote honourable practice. All three organizations have been fortunate in the leaders of the profession who have guided their counsels: no practitioner has been led to suppose that because he has this form of insurance behind him he can afford to relax his customary care and scruple, or fall below the accepted standard of ethical conduct, and in that respect they deserve well of the public as well as of the professions they serve.

HOUSING AND ILLNESS

AN ANALYSIS OF 1,000 MEDICAL CERTIFICATES

BY

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At the end of 1952 the Metropolitan Borough Council of Hampstead decided to review all its outstanding housing applications. There were 3,867 such applications at that time, of which 3,405 had the necessary residential qualifications. Of these 3,405, 1,249 were considered to have very little or no housing need. Of the remaining 2,156 applications, 706 were supported by one or more medical certificates—that is, 33% of all genuine applications had supporting medical certificates. In addition to these 706, which form the bulk of this analysis, all housing applications supported by medical certificates submitted between April 1, 1953, and March 31, 1954, are included. These are shown separately in the Table, as it was felt that there might be some significant differences between current applications and those on the waiting-list.

The total of 1,028 applications were supported by medical certificates relating to 1,240 persons, made up of 685 females (55%), 291 males (24%), and 264 children (21%). It is not surprising to find that the housewives are the most affected by bad housing, but it is suggested that some of this excess could be regarded as being on a par with "industrial" illness and neurosis. In the same way that adverse environmental conditions in factories and workshops have been shown to affect the health of the employees, so bad working conditions in the home might affect the housewife.

Reasons for Certification

In 861 applications (84%) only one member of the family was certified as suffering from an illness related to their housing conditions; in 131 applications (13%) two members were certified, in 28 applications three members, in seven applications four members, and in one application five members of a family were considered to be affected.

With regard to the number of diseases each person was certified to be suffering from, 1032 persons (83%) were suffering from one illness, 175 persons (14%) from two illnesses, 32 persons from three illnesses, and one person from four illnesses. In calculating these figures an effort has been made to count only different illnesses and not different symptoms arising from one illness. For instance, an old person might be certified as suffering from "bronchitis, hypertension, and arthritis," and this has been counted as three illnesses. On the other hand, a person certified as suffering from "asthma, hayfever, and bronchitis" is recorded as a single illness—asthma.

A broad grouping of the diagnoses of the total 1,482 "illnesses" is shown in the Table. Twenty-five per cent. of all certificates related to upper or lower respiratory infections excluding tuberculosis, which accounts for 7.5%. The next commonest cause is the group comprising arthritis, fibrositis, and rheumatism, accounting for 15%; while psychological conditions (anxiety states, neurasthenia, depression, etc.) come third at 14% of the total. Heart disease accounts for 11%, but most of these certificates are requests for ground-floor accommodation.

The differences in illness between the adult males and females are quite marked. The females show an excess of certificates relating to "rheumatic" disorders (20%) and psychological conditions (19%), whilst the males have an excess in the bronchitis–emphysema group (17%) and in the tuberculosis group (16%). The commonest complaints certified in children were bronchitis (30%), tonsillitis, catarrh, etc. (20%), asthma (12%), and tuberculosis (6%).

Illness Involved

	Females		Males		Children		Total	%
	Review	1953–4	Review	1953–4	Review	1953–4		
Bronchitis, bronchiectasis, emphysema	53	27	42	17	67	20	226	15
Asthma	20	9	12	4	25	9	79	5
Tonsillitis, catarrh, colds	9	7	3	2	39	18	78	5
Tuberculosis	29	10	38	16	8	10	111	7·5
Arthritis, rheumatism, fibrositis	119	48	26	12	12	7	224	15
Psychological	105	56	22	3	13	9	208	14
V.D.H., unspecified cardiac failure	46	17	14	4	1	—	82	11
Coronary disease	8	3	10	11	—	—	32	
Hypertension	25	15	6	2	—	—	48	
Peptic ulcer	15	1	23	9	—	—	48	3
Rheumatic fever	3	—	1	—	7	—	11	
Varicose veins	18	4	—	2	—	—	24	
Pregnancy	22	7	—	—	—	—	29	
Gynaecological	9	2	—	—	—	—	11	
Other	119	51	36	23	31	11	271	18
Total	600	257	233	105	203	84	1,482	

There is little difference between the distribution of causes from the two sources of certificates, the only marked difference being between tuberculosis in children, which accounts for 12% of current certificates and 4% of the waiting-list. If it is assumed that there has been little difference in incidence in the last three or four years, then this difference could mean that these cases are tending to be rehoused before other cases.

The Question of Priority

There is no doubt that any badly housed family will be given a better opportunity to be healthy in adequate and satisfactory accommodation, and therefore all families whose health is considered by their doctor to be affected adversely by their living accommodation must be regarded as genuinely in need of rehousing. However, if all such patients were given equal priority on medical grounds, the whole object of awarding priority would be defeated. This difficulty is underlined by the following figures. During 1953, Hampstead Council found accommodation for 143 applicants, involving 443 persons. The number of families on the waiting-list at December 31, 1953, was 4,187, of whom about 1,000 had supporting medical certificates. Owing to the shortage of housing sites, the Council does not believe that it will be able to rehouse more than 900 families in Hampstead during the next five years. Thus the problem presented to the medical officer of health is to allocate priority even among the top priority group. Furthermore, it is the duty of the medical officer of health to prevent illness, and therefore it is necessary so to allocate priority that healthy people who are in danger of falling ill because of their accommodation are given an opportunity of being rehoused before any illness develops. It is not enough for a housing department to rehouse the ill.

Respiratory Disease.—The problem of assessing fairly the priority to be awarded to a family with illness is extremely complex. Unfortunately, little help can be obtained from the "literature." Thus the results of an investigation in Glasgow in 1928–9 (Smith, 1934) into housing conditions and respiratory disease were equivocal: a greater morbidity was found on the new estates, but the two groups

utilized were not strictly comparable, as among the rehoused group there was more unemployment. The fact that 25% of all certificates examined here related to respiratory infection must be contrasted with the observation that these diseases account for about 30% of the general practitioners' consultations (Pemberton, 1951; Logan, 1953).

Rheumatic Disorders.—These accounted for 15% of the certificates. Yet Kellgren *et al.* (1953) could find no evidence in their study of rheumatic complaints in an urban population that damp housing conditions greatly affected the incidence of rheumatic complaints. Furthermore, they showed that 33% of the population stated that they had suffered from a rheumatic complaint during the preceding five years. Similarly the Empire Rheumatism Council (1950) found no satisfactory evidence that home conditions are of aetiological importance in the causation of rheumatoid arthritis. Perry and Roberts (1937) found a significant association between overcrowding and the incidence of rheumatic fever, but Savage (1931) considered that housing factors could be, at the most, only "slightly predisposing factors" in the aetiology of rheumatic fever. More recently Hewitt and Stewart (1952) reported that they could find "no evidence that rheumatism is associated either with bad housing conditions or with poverty, *per se*."

Child Mortality.—The findings in regard to child mortality have been more definite. Thus the Registrar-General (1935) found that mortality from all causes at ages under 5 increased with greater overcrowding, the mortality from bronchitis, measles, and whooping-cough showing this association most definitely. Again, the Chief Medical Officer of the Ministry of Health (1938), in his report for 1937, states, "The density figures show that the level of mortality, especially at 1–2 years, is, without doubt, closely associated with the level of the housing index."

Tuberculosis.—Most investigators have also been able to demonstrate a correlation between adverse housing and tuberculous infection. Benjamin (1953), in a study of the differential incidence and mortality from pulmonary tuberculosis in the London Metropolitan Boroughs, confirmed the findings of Hart and Wright (1939) and Stein (1952) that overcrowding adversely affected tuberculosis mortality. The increased incidence of tuberculosis among contacts (especially child contacts) of known cases has also been demonstrated (Blacklock, 1947; Miller, 1947; Aspin, 1952).

Mental Disease.—Not so much research has been carried out on the causative role of bad housing in mental disease. Hadley *et al.* (1944) found the Army rejection rates for personality disorders one and a half times as great in slum areas as in other areas. Hyde and Kingsley (1944) found the total incidence of mental disorders increased significantly from the best to the poorest communities. But in neither paper is there enough evidence to say that it is the bad housing itself, rather than other associated factors, that causes the increase in mental disorders.

Assessment for Rehousing

Thus the difficulties of fairly allocating priority on medical grounds are great. There are three basic ways in which housing conditions may affect health. These are structural defects and insanitary nuisances, overcrowding, and extraneous factors such as stairs and other tenants.

Structural defect and insanitary nuisances can often be remedied by the intervention of the sanitary inspector; alas, many tenants do not wish the inspector to take action, as they are afraid either that they will be evicted by the landlord or that they may lose points in their housing application.

Overcrowding can be alleviated only by rehousing, and in the Hampstead scheme points are given for overcrowding. In addition to these points, more are given for each additional bedroom required. Unfortunately, in assessing overcrowding a baby under 1 year does not count, and a child between 1 year and 10 years counts as half a unit. In view of the established fact that these children are the most affected by bad housing, it would seem wiser if they counted at least as one whole unit. However, this difficulty can be overcome to some extent by allotting more medical points to a child with an illness than to an adult with the same condition. Points are also allotted for lack of certain facilities and for separated families and families without separate homes. Additional balancing points are awarded for the period on the waiting-list and for service in the Forces (including the Merchant Navy). These additional points are used to choose between two applications which otherwise have the same total points.

The medical officer of health can award up to a maximum of 20 points for certified ill-health or disablement. The guiding principles in awarding these points are that the illness is related to or adversely affected by housing conditions which can be alleviated only by rehousing, and that it is likely that the patient will materially benefit by rehousing. The medical officer of health, therefore, before allocating points, requires a complete report of the housing conditions, including the structural state of the house and the number, sex, and distribution of the people living there. In addition he needs quite a detailed account of the illness.

Chalke (1954) has elaborated all the information necessary before allocating priority to persons with tuberculosis. This includes the activity of the disease, the infectivity of the sputum, the age of all possible contacts, the standard of patient and contacts in respect of precautionary measures, and the standard of present housing, including whether the patient has to share lavatory and bathroom with other families. After this information has been obtained, Chalke divides his tuberculous applicants into five priority groups. Similar detailed information is required about each applicant, the details varying, of course, according to the disease. A frequent request is for a person to be rehoused on the ground floor because of varicose veins. Immediately one wants to know the severity of the condition, whether an ulcer is present, and why operative treatment is not indicated. A certificate which states that Mrs. A is suffering from a "medical condition" is quite useless.

Provided adequate information is available, the points system works reasonably well. Its only defect is that it cannot cope with a person suffering from an illness aggravated by his present accommodation, which is otherwise satisfactory. For instance, a person with a coronary thrombosis living three stories up may be given the maximum medical points, but this will be insufficient for rehousing unless he has other points, which of course he will not have if his accommodation is otherwise suitable and adequate. Similarly with some psychological situations, such as intolerable hostility between tenants or tenant and landlord. In such cases, although rehousing may be clearly indicated on medical grounds, the award of medical points alone will not be sufficient to obtain overriding priority. In these cases an effort must be made to arrange an exchange; but this is usually difficult to carry out, as the occupiers of ground-floor flats are not willing to leave them for upstairs accommodation, and people are not anxious to move into a house where the landlord or other tenants are known to be querulous.

Summary

An analysis of 1,028 applications for rehousing supported by medical certificates showed that 25% related to respiratory infections, 15% to rheumatic disorders, and 14% to psychological disorders. Of all these certificates, 55% related to women, 24% to men, and 21% to children. A brief survey of the previous papers shows that the fact that bad housing causes or aggravates these conditions is not proved, with the exception of tuberculosis and infections in young children. The medical officer of health who has to award "medical points" for rehousing needs to know much detailed information about the housing conditions and the medical condition before he can allocate points. The former information

he obtains from his inspectors, for the latter he is dependent on the reports of the general practitioner or specialist.

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BRITISH DOCTORS IN RUSSIA

EXPERIENCES AND IMPRESSIONS

A party of 17 British doctors and two lay persons connected with the Health Service* recently returned from a three-weeks visit to Russia. The visit was undertaken under the auspices of the Medical Section of the Society for Cultural Relations with the U.S.S.R., and on September 30 six members of the party attended a press conference at the headquarters of the Society and gave some account of their tour. They were Lord Amulree, Dr. Alex Comfort, Dr. L. Crome, Mr. A. W. L. Kessel, Professor Esther Killick, and Dr. N. B. Malleson.

The tourists had spent a week in Moscow, where they met officials of the Ministry of Health, and then had divided into sections, visiting various parts of the Soviet Union, including Leningrad on the Gulf of Finland, and the Republic of Georgia on the shores of the Black Sea. As many contacts as possible were made, from the medical institutes in Moscow to the rural polyclinics. One member of the party, Dr. J. G. Ollerenshaw, a general practitioner of Skipton, spent two days with an "opposite number" in a village about 60 miles from Moscow and also two days on a collective farm in Georgia.

The Status of the Russian Doctor

The party were plied with questions from the press conference on subjects ranging from the professional and economic status of the doctor in Russia, their distribution, and the scope of general practice, to the reliability of public health data and the practice of psychiatry. Much of the information brought back by the party was in a line with the facts given in the paper by Kurashov, the Deputy Minister of Health, printed in the Educational Number of the *British Medical Journal* (August 28, p. 510). The medical service in Russia is free to all, but, except when supplied to hospital in-patients, medicines are charged for at a price proportional to cost. The person who cannot afford to pay is supplied free, and preparations such as insulin are also free. A small amount of private practice still exists, mostly among the more senior members of the profession, and there is no legal restriction on the acceptance of a fee. But private practice is said to be of very small account.

The medical service is entirely salaried. The new doctor on qualification receives a salary of 670 roubles a month, about the same as any skilled worker. An unskilled labourer earns about 400 roubles a month, a foreman in industry 800, and a miner 2,000. The salary for the ordinary doctor goes up to 1,200 roubles or more, but with the attainment of higher qualifications it rises steeply. A professor may receive 5,000 roubles, and the head of an institute—the institute being a medical faculty separated from the university and under the Ministry of Health—receives 6,000, plus half the salary of a professor, making 8,500 roubles. The great difference between the salary of the clinician and what is termed the "medical scientist" struck the visitors most forcibly.

At age 55, or after 25 years' service, the doctor is eligible for pension amounting to half salary, but apparently he may continue working after reaching pensionable age. Three years after qualification he can claim a subsidized refresher course, and he may do so again after further years for as long as he continues in the service.

Discipline and Appointment

Asked about the disciplining of doctors, the members of the party said that they had not elicited much information. In each district there is a commission, medical in membership, presided over by the head of the local medical organization, which is responsible not only for disciplinary action but for removing misfits and resolving disputes. The doctor's right of appeal against a decision to remove him on the ground of misconduct was not exactly ascertained, but it was understood that he had the right of complaint to his trade union or local party, and that civil action could be taken on his behalf. Vacancies in the service are filled by election by the medical commission after consultation with the various bodies concerned. Each post is re-advertised at five-year intervals, but the incumbent is eligible for re-election if he wishes. When a student qualifies he is invited into a board-room, where he may face some twenty people accustomed to looking over the "new boy." These are representatives of organizations wanting doctors; they state their needs, and with the help of the candidate's teachers an effort is made to place him where he will be most useful and contented.

For three years the young doctor must go where he is sent; but after that he can choose his place of practice. During his last year as an undergraduate he may be taken with others to some centre where he is able to see the service in operation. Often groups of five or six work together, and thus afford a means of bringing medical services into more remote districts. Great prestige attaches to willingness to work in uncongenial places, and this is reinforced by laudatory mention in the papers and the award of medals. In reply to a question Lord Amulree said that he believed some financial bonus also attached to practice in the more remote regions. One Moscow medical school "patronizes" a region 200 miles away, and there is a constant interchange of personnel—doctors, auxiliaries, and students.

Surplus of Doctors

A strong impression was given that, in some areas at any rate, there is a surplus of doctors. At the polyclinics a two-shift system is worked, and the doctor's hours are five or six daily, including the time spent on visiting. One member of the party suspected that the doctors might suffer from lack of clinical material. Another spoke of visiting a medium-sized rayon factory, where they found several doctors at the polyclinic, a separate clinic for young children, another for older children, and yet another doctor, part-time, attached to the athletic activities of the factory. A country hospital which was visited seemed to have a larger staff than could be fully employed. There was said to be, on an average, one doctor to every 660 people, but in some places the ratio was even smaller.

*Their names were given in our news column on September 11 (p. 655).

A member of the conference asked whether any discrimination against non-members of the Communist party had been noticed, but the reply was that that question had not been raised. The impression was that most of the students were members of the Young Communists League, but apart from the need to pass a competitive examination there was no restriction on entry to the medical schools. As in Britain, those wanting to become doctors greatly exceeded the supply of places in the schools.

The members of the party were asked for their general impressions of the standard of medicine, an admittedly difficult question to answer. One member said that he had visited two surgical institutes and found one of them rather poor and the other "absolutely brilliant." Professor Killick said that she found no physiology department which could be described as good. The research departments were to some extent cut off from work going on in Western Europe, and physiologists seemed to be more cut off than others. Dr. Crome gave a more favourable opinion. Most of the visitors, he said, had read papers during their tour. He himself read a paper on neonatal jaundice and another on the history of British medicine, and the subsequent discussion was well informed. Some specialists seemed to know more about English and American work in their field than the corresponding English and American specialists would know about Soviet work. But it was the general view that information on Western medicine was not up to date. Russian doctors themselves were the first to admit their need for information about the West, and were said to be anxious to receive invitations to conferences in Western countries.

The Doctor–Patient Relationship

Several questions were asked of the party about their impressions of the doctor–patient relationship. Did the Russian doctor owe his first duty to his patient, to the man's employers, or to the State? Dr. Crome said that on visiting a polyclinic some distance from Moscow they were told that the patients almost invariably asked for their own doctor by name. In general practice the patient went to his own doctor or his partner at the polyclinic, very little practice being done from the doctor's house. But here there was a sharp divergence from British ways. In Russia there are three principal streams of medical education: therapeutics, which includes general medicine and surgery and obstetrics and gynaecology; paediatrics; and hygiene. A student normally qualifies in only one of these subjects. The result is that children are attended separately from their parents, in special paediatric clinics. Furthermore, if husband and wife work at different factories they will go to their own factory clinic and be seen by different doctors. The family doctor as we know him does not exist. However, the mothers did not seem to mind sending their children to a separate doctor; it was accepted as part of the general scheme of things.

In the hospitals visited the party saw nothing but good relations between staff and patients. They saw a number of surgical cases, and were present at some major operations under local anaesthesia, and the *rapport* between surgeon and patient seemed particularly good. They also saw preparations for painless childbirth, and one woman—a primigravida—in the second stage of labour, and she seemed to be having no pain.

Preventive Medicine

The wide use of "sanatoria" was described. These places are not sanatoria in the Western sense, but rest and health centres under medical supervision, to which people are sent with a view to prevention of illness. They have been established on a fantastic scale, built mostly on very high ground, sometimes with a private funicular railway. There are about 1,300 of them, ranging from wooden cottages to large hotel-like establishments. Great emphasis is laid on physical treatments, both at the sanatoria and elsewhere, and special baths, heat, exercises, and electrical therapy are used for a wide variety of complaints. Some members of the party stayed in one sanatorium, which was a kind of cross between a nursing-home and a high-class hotel. The quality of the *x*-ray apparatus and other furnishings was found to be often better in the sanatoria than in the hospitals. The sanatoria are subsidized by the trade unions up to two-thirds of the cost. Those who are sent to them pay, presumably, for their maintenance, but all treatment is free.

The public health organization in Russia is very different from what is familiar in the West. Some members of the party said that they had difficulty in finding a "real live medical officer of health." The chief official responsible for the medical service of a district takes all medical services, curative or preventive, within his province. Even the administrators of the Ministry of Health do clinical work part-time. If an epidemic, say of typhoid, should occur, the chief of the laboratory would take over the functions which in this country would fall to the medical officer of health.

The lack of reliable vital statistics was a matter of comment. Statistics are presented generally in the form of percentage increases or decreases on previous years. Thus trends and tendencies are recorded rather than absolute numbers The material is collected by local medical workers in the field, but it could not be said how far it was checked. Medical organization itself is a specialty in Russia. Some of those approached, when asked what their specialty was, replied, "I am an organizer of health services."

Inquiries about mortality and morbidity were met by the statement from the Ministry that the chief cause of mortality in Soviet Russia was old age—in other words, cardiovascular diseases and hypertension. Lord Amulree remarked that, so far as could be ascertained, there was no increase in lung cancer comparable with that found in some countries of Western Europe, though many people "smoked like chimneys." In 1952 a good deal of propaganda was directed against smoking, not, however, on the ground of possible cancer, but as likely to cause cardiovascular diseases.

Psychiatry

Questions were asked as to the status of psychiatry in the Soviet Union. The party visited a mental hospital outside Moscow, where the number of patients ran into four figures and the medical personnel numbered about 40. Every patient appeared to be receiving some kind of treatment: it was not merely a custodial institution. Psychiatric theory was dominated by the tenets of the Pavlovian school, and there did not seem to be any rival teaching. Psychotherapy was practised, but psycho-analysis, which was considered unscientific, was not practised at all. Case histories were elicited, and the patient's condition was explained to him, with emphasis laid upon its reversibility. Insulin was used in cases of schizophrenia, also pyrexial treatment. Much stress was laid upon occupational treatment of every conceivable kind, including work on collective farms.

In Russia there appears to be no equivalent for our certification of mental cases. The doctor advises hospitalization of the mental patient if he considers it necessary, after consultation with the family, and, should this be resisted, the doctor may apply to the court, where the proceedings are summary, and the patient may be ordered to be sent to hospital. If his family choose to fetch the patient back there is nothing to stop them, but the doctor can apply again to the court and declare the patient's liberty to constitute a public menace.

Altogether psychiatry does not claim as wide a field as in this country. It is not brought into relation with education or delinquency or sociological problems. The doctors who practise it are simply alienists. Minor neuroses are dealt with through the ordinary clinics, and psychiatric attention is practically confined to the psychotics. The Soviet people professed to be surprised at the extent of mental illness in the Western world, and declared that in the Soviet Union it was decreasing rapidly.

A question was asked about homosexuality. Little had been said on the subject. Some Russians declared it did not exist there, but one member of the delegation "guessed that homosexuality if found would be dealt with savagely."

Conclusion

A final question related to nurses and auxiliaries. In a hospital of about 1,500 beds the party found a number of trained sisters and a large number of girls and women who perhaps might be called nursing orderlies. One member said that the impression he received was that there was nothing like the sharp differentiation between doctors and other health staff which obtains in this country.

In conclusion, the visitors remarked on the friendliness of all whom they met, medical or lay. Most of them went into ordinary people's homes, and found the people, although obviously shy and afraid that their houses might not be good enough, extremely friendly and willing to exchange views.

WORLD POPULATION

FALLACIES IN PREDICTION

Twenty years ago the falling birth rate in many Western European countries was a subject of frequent public discussion, at least for politicians, journalists, and economists. Since the second world war, the subject has changed and broadened: it is the way the whole world's population is increasing, particularly in the East, and the fear lest food supplies may not be adequate, that now form the basis for international conferences. Unesco made "Food and People" its topic of the year for 1949 and issued many popular booklets on the theme. F.A.O. and W.H.O. periodically make dire pronouncements, or discuss the need for birth control or for improving agriculture in the so-called backward countries. Communist countries believe in expanding populations, the West in restriction: this came out clearly at the United Nations World Population Conference in Rome last month, where the Vatican spokesman also favoured restriction in under-developed countries, though only by "natural" methods (abstinence or the rhythm method). In the background is the thought that population pressure is a cause of war, and the fear that victory may be with the big battalions. For medical men there are new ethical problems, such as whether it is right to save children from a malarial death at 3 if they will die of starvation at 6.

But while the problems, the predictions, the international projects get into the world's press, blessed by government agencies or assorted panels of international experts, very little is heard of the facts on which their pronouncements are supposedly based, and nothing is said about the possibilities of error in assessment. On the other side there are one or two useful books, such as *World Population and World Food Supplies*, by Sir John Russell, F.R.S., to which the *Times* devoted a special article on September 16. The symposium on "The Number of Man and Animals," held on September 24 and 25 by the Institute of Biology in London, may also have served to damp the ardour of the prophets. It brought together a number of eminent speakers who agreed in emphasizing the degree of our ignorance on all population problems. More factually based surveys are needed if any true conception of our future is to be gained.

Current Estimates

Lord Boyd Orr, F.R.S., sketched the framework of the population problem in his symposium paper. The world population is estimated to be growing by 30 million people a year, and to reach 4,000 million total by 1984. China, with her 600 million inhabitants, has a national policy to add 12 millions to this figure every year. In India, where birth control is government policy, a falling infant mortality may cancel out the falling birth rate: at present a population of some 450 million is adding an extra 5 million to itself each year. At the moment the U.S.A. is increasing annually by 2½ million, but this may be only a post-war boom. It is expected that under-developed countries will multiply rapidly as they get the benefit of United Nations aid and Western medical care. But Professor I. Schapera, from the London School of Economics, pointed out that not all census figures can be trusted, particularly in Africa, where there are no official records of births and deaths to check against periodical census returns. He quoted the particular case of the Bechuanaland protectorate. In the 1936 census one district was put down as "estimated, males 7,000, females 3,000, total 10,000"—an unlikely sex distribution, while two years later another estimate of the same district was "total approx. 2,000." These figures get added into the total for the protectorate without comment, and such totals may be used in later calculations on a continental or global scale without it being realized that they may be very wide of the truth.

Europeanization and the Birth Rate

Within the protectorate it is difficult to be sure whether the birth rate is going up or down under European influence, unless some special study of child-bearing in a large representative sample of families is possible. In any case European influence is very complex, and means much more than decreasing infant mortality and lengthening life. Missionaries may stop polygamy or the rule that a man must give his brother's widow further children. Industry may draw bachelors away from their villages and prevent their marriage. Among the Bechuanaland Tswana birth control has for long been practised (coitus interruptus, etc.) in conformity with a tribal belief that women should not have children more frequently than once every two years or so, and Western contraceptives of themselves would not alter this. Dr. A. S. Parkes, F.R.S., in another paper at the symposium, instanced a plant, *Lithospermum ruderale*, a common weed used by American Indians as a contraceptive and shown by laboratory science to inhibit oestrus and cause ovarian atrophy; and yet other contraceptive devices are known among primitive peoples. Professor E. Grebenik, also from the School of Economics, reminded the conference that the birth rate began to fall in France during the nineteenth century, long before the introduction of mass contraceptives. Human fertility—that is, the number of offspring produced at a given time and place—is the product of economic and social factors as well as of religious beliefs and the standard of nutrition and medical care. Prediction, as opposed to guesswork, of future population trends is therefore very difficult.

Death Rates Decisive

But Professor Grebenik, as a demographer, emphasized that present population growth is the result much more of a steep fall in death rates than of any change in fertility. In Japan the expectation of life at birth rose by six years between 1947 and 1950 thanks to the hygiene introduced by the occupation authorities. Professor A. Leslie Banks described the sudden drop in the death rate in Ceylon in 1947 from over 20 per thousand to around 14 through malaria control with D.D.T., and went back to nineteenth century England to show that what had happened in Britain over the past 150 years was a parallel, though in slow motion. Throughout the eighteenth century the expectation of life was probably something over 20 years only. As late as 1838 the average tradesman died at 26, the average labourer at 24, but a London gentleman might reasonably hope for 44. Contrast this with present-day expectations in the 60s and 70s, the result very largely of the application of medical and scientific knowledge. It is now possible to bring under control many of the major causes of death, and to do it so rapidly as to unbalance the whole biological, economic, and social structure of large areas of the world. But rapid development of the under-developed is not necessarily straightforward, even when international teams with knowledge and money arrive to spray D.D.T. or immunize with B.C.G., if the local population does not grasp what is going on or has only a passive role in the affair. Professor Banks quoted Dr. Cicely Williams: "As a result of ill-considered milk schemes I have seen babies of 2 months taken off a good lactating breast and put on skimmed milk. I have seen them developing xerophthalmia, yet neither the doctor nor the nurse had noticed it—they

were too busy distributing the milk." Bringing modern medicine to peoples unfamiliar with Western science is a cultural operation nearly as complex as introducing European machine civilization or scientific agriculture, so here again prediction is less easy than it seems.

Patterns in Nature

When man proves intractable, science turns with hopes of enlightenment to animal observation. However, Dr. David Lack, F.R.S., from the Edward Gray Institute of Field Ornithology, Oxford, was forced to admit that the population problem has been studied in few wild animals, and answered in even fewer; and those that have been studied are probably atypically simple. It seems at present that the numbers of wild animals are chiefly determined by the death rate. Animal mortality is so high that the average age of wild birds is a very small fraction of their potential life span. In birds death is most often due to food shortage, least often to disease, to judge by examination of wild birds found dying. No two species of bird depends on the same food supply, which argues evolution by intense competition, and intraspecific fighting for food is regular in winter. The effect of predators is complex: they may attack predominantly birds already diseased or those who anyway would die of starvation. Among fish, consider the roach: in Holland 6½% of those caught by fishermen have tapeworms, whereas 30% of those taken by cormorants have the worm. Thus the bird predator reduces disease incidence. Moderate fishing of cod by man *increases* the cod population, by removing the large and old fish and so leaving more food for the young ones, which consequently grow faster and mature sooner, and more often reach reproductive age. Disease itself may predispose to starvation—some think that the British red grouse succumbs to a common nematode parasite only when food is short. Among mammals which show four- or ten-year population cycles, such as the varying hare, some species die with peculiar neurophysiological symptoms which may be the result of nutritive deficiency.

One moral from this kind of work is the complexity of the factors which may control the size of a population. Another, a grim one for humanity, is that Nature controls numbers by starvation.

Food and Fertility

Dr. John Hammond, F.R.S., took up the discussion of the effect of food from another side. How does diet alter fertility, in humans as well as animals? Fertility can be systematically considered as dependent on the age of puberty, the frequency with which births occur in a given species of mother (depending on duration of pregnancy and frequency of oestrous cycles), the number of eggs shed at each ovulation (and male capacity to fertilize them all), and the number of fertilized eggs which survive. Puberty may come earlier on a good diet, later on a bad diet, simply because ovarian development is delayed by inadequate nutrition. Malnutrition may result in total anoestrus, or in "silent heats" (ovulation without the usual accompanying symptoms). In cobalt-deficient areas ruminants do not become pregnant until enough cobalt has been accumulated in the rumen for manufacture of vitamin B_{12} by the gut flora. In phosphate-deficient areas cows calve only every second year because the body phosphate lost in lactation leaves insufficient for running the oestrous cycle. In some mammals, such as sheep, improved diet for a month before mating increases the number of eggs shed and hence the number of foetuses. In most species most fertilized eggs perish, and the cause is genetic in at least some cases. Poor nutrition plays its main role in late pregnancy in animals as in humans (prematurity, toxaemia, etc.). Poor nutrition in man reduces testosterone and libido before it cuts the sperm count. Prolonged suckling in women delays the next pregnancy, perhaps by draining away essential phosphate. Individuals who mate late in life are less fertile than those who mate early, and this is true for animals as well as man.

Effects of specific nutrients on ovulation bring to mind some of Dr. Parkes's remarks on the future of contraception. He mentioned three hopeful lines for research: the discovery of something which would for a time, but temporarily, inhibit ovulation, as do, rather drastically, large daily doses of oestrogen given from a few days after menstruation; the possibility of temporarily spoiling the conditions for the fertilized egg in the Fallopian tube and uterus—again, oestrogen will "lock" the egg in the tube, or prevent implantation—by taking something during the third week of the menstrual cycle; lastly, the search for something to keep the cervical mucous plug impermeable to sperm (under natural conditions the plug becomes permeable at mid-cycle, under the influence of body oestrogens).

If not by contraception or starvation, perhaps by war: atomic bombs may control world population. Here Professor L. S. Penrose, F.R.S., on eugenics was relevant. The effect of radiation on exposed survivors is supposed to be an increased mutation rate, "not necessarily a bad thing, it may increase variability and adaptability in the population where it occurs." Genes cannot be classed as good or bad, it depends on the environmental situation. The sickle-cell trait in the blood when homozygotic (SS) predisposes to severe anaemia, when heterozygotic (Ss) protects the red cells against malignant malaria. Consequently hygienic measures against malaria remove the advantage of the heterozygotic form and should thereby tend to diminish the homozygotic form also—that is, the incidence of sickle-cell anaemia.

Future Prospect

If there was one conclusion from the Institute of Biology's symposium it was in Lord Boyd Orr's words, "It is impossible to predict the future with any degree of certainty." However, he permitted himself a guess, that world population might stabilize itself at 5,000 to 6,000 million in the next half-century. If so, he thought that world agriculture would develop so as to offer a high standard of living to this number of people. And here a point or two from Sir John Russell's book already mentioned is relevant. If the world had still to rely on the cereal seed used 50 years ago we should all be near starving. Thanks to a few geneticists and others we now have drought-resisting and other special wheats with increased yields. The same breeding miracle may be worked on the rice grown in the Far East. Sir John reviews agricultural practice in very many different countries and shows how each presents its special problems, and each (not excluding that in Western European countries) could be improved, if economic factors and man's beliefs will allow modern science to help. And this may serve as a fitting conclusion to the "Food and People" problem: it has to be viewed as the sum of a vast number of local problems each with its own characteristics, and not as a global problem in which all the essential detail has been lost and the picture become a blur.

THE NEW ACADEMIC YEAR

KING'S COLLEGE HOSPITAL

Sir Russell Brain on the Future of the Doctor

The 125th session of the King's College Hospital Medical School was opened on October 1, Sir William Gilliatt presiding. The orator was Sir Russell Brain, Bt., P.R.C.P., who spoke on some aspects of the future position of the doctor in society.

Speaking, first, of medicine as a science, Sir Russell Brain said that the greatest change during his own thirty years of practice had been the enormous increase in its complexity. The more facts that were known, the greater were the possibilities of interconnexion. Life was, of course, much simpler when the doctor knew less. But only ignorance was simple, and those who nowadays hungered after simplicity were either ignorant themselves or traded upon the ignorance of others.

The first important result of the great increase in the volume and complexity of science as applied to medicine

had been the need to revise educational methods, including examinations, but a sense of proportion must be preserved. Medical education was only a subordinate part of a larger problem. The great advances in medicine and the development of specialization had made it necessary to think out again the part to be played by the general practitioner, the consultant, and the hospital. Until that was done it was difficult to decide logically what changes were necessary in medical education.

The Doctor in Modern Society

The status of the doctor in modern society was a matter upon which it was extremely difficult to generalize—for the country was still in a state of transition since the nationalization of the hospitals and the medical profession. Too much importance could be attached to temporary difficulties unavoidable in a period of revolutionary change. Some people had the view that patients were inclined to think less of their doctors. This statement had been made about general rather than consultant practice, and yet the change in relationship between doctor and patient had been much greater in the case of the consultant than in the case of the general practitioner, who in the past was in any case deriving a good deal of his income from the insurance scheme.

It was easy to see how the changes in medicine had combined to unsettle the relationship between doctor and the public. More than ever before the doctor possessed mysterious powers over body and mind. It was no wonder that the public's attitude to the doctor was that they took his miracles for granted—and brought actions against him for negligence. How much did the remedy lie within the doctors' powers? By what right did the doctors claim either special authority or special privileges which went with it?

Medicine alone took as its province the whole man. That was the foundation for the doctor's unique status, and it was of the utmost importance to see that that was preserved, for the doctor remained a stable point in a changing world. Medicine was the art of human relationships. It still confronted, as it had always done, the human situation —accident and disease, birth and death; for all the changes in medicine, medicine remained the same. The fundamental relationship between doctor and patient did not really alter. But much else had changed and was still changing. The relationships of individuals to one another, or one society to another, were being modified in all parts of the world. In some countries the relationships had changed more in the last fifty years than in previous recorded history. Human philosophies were changing. Doctors were themselves part of society, subject to the same social, political, artistic, and philosophical influences. But as doctors they should not think they had any peculiar responsibility for setting the world right. They should recognize their limitations: their tasks were exacting enough.

Where did the ordinary doctor stand in this changing world? A new order of things was painfully coming to birth, and perhaps the most valuable qualities a man could possess would be patience and understanding, both of which contributed to a man of achievement. "We have to salvage what is valuable in the past," said Sir Russell Brain in conclusion, "while welcoming whatever benefits the future has to offer."

ST. GEORGE'S HOSPITAL

Minister of Health on Clinical Research

At the opening of St. George's Hospital Medical School on October 1, the Minister of Health, Mr. IAIN MACLEOD, spoke on the contribution that the general practitioner could make to clinical research. He took as his theme Hunter's dictum: "Why think? Why not try the experiment?"

Medicine, said the Minister, was still happily largely an art, but it was an art wedded to science, and, as science was dynamic, medicine could not stand still. Research in medicine was of two main kinds: it could be carried out in specially equipped laboratories, or it could be carried out at the bedside by doctors using their own powers of observation. The first was the province of a few, but clinical research was within the scope of every doctor. It was possible, of course, for the two types of research to overlap to the point of complete coalescence. Sir James Mackenzie was an outstanding example of a doctor who carried out first-class clinical research: as a general practitioner he had evolved his own bedside equipment, the polygraph.

Long-term research was the responsibility of the Medical Research Council, which was spending £430,000 a year on research directly connected with the patient. As a result of the recommendations of the joint committee on clinical research, the new Clinical Research Board had been set up. The Minister attached great importance to the committee's recommendations. The position of the universities was in no way diminished by this new development. What the Clinical Research Board would do was to supplement the universities' activities and provide facilities which the universities could not reasonably undertake. The joint committee had recommended that careers in clinical research should be equated with careers in the Health Service, and he agreed with this.

Those who could devote their lives to research would be in the minority, Mr. Macleod continued, but every physician had a wealth of material for study, provided that, from the beginning, he kept adequate records. As a general practitioner's son he recognized the importance of maintaining the links of the general practitioner not only with hospitals but to some extent with academic work. The growth of group practices was bound to stimulate interest in particular fields. He hoped that, arising out of the Clinical Research Board, interest would be encouraged in research in the smaller hospitals and in general practitioners' surgeries as well. A man should not feel that because he was going into general practice he had, in some obscure way, "failed," but that he had a contribution to make not only to healing but to research.

ROYAL FREE HOSPITAL

"Medicine as an Art"

The inaugural ceremony of the session of the Royal Free Hospital School of Medicine was held in St. Pancras Town Hall on October 1. Sir FRANCIS LASCELLES presided.

Mr. A. N. GILKES, High Master of St. Paul's School, spoke on "Medicine as an Art." He quoted Lord Dawson of Penn, who had said that medicine was an art based on many sciences. The students in front of him, said Mr. Gilkes, would in time serve innumerable patients. They would themselves observe certain symptoms, and others would be described to them by the patient "with his usual exasperating inaccuracy." But on the top of their scientific study of the patient they would need to exercise sympathy and something which for the moment he called creative imagination. By this he did not mean the faculty of forming images in the mind of things which were not there, but a creative faculty which built upon whatever evidence was elicited.

They all knew how very largely success in treatment depended upon the patient's confidence in his physician. Perhaps this explained why it was that in times past different and even opposite treatments had been successful in what was apparently the same disease. Over and above all the scientific approaches to the patient was the need for sympathy, understanding, friendship on the part of the physician, something which went beyond science, a certain love for mankind. Scientists themselves had confessed that sometimes at the moment of a discovery the scientific method was in suspense, and the final operation was due to intuition, a kind of illumination, an exercise of imagination, an uprising from the unconscious, although, of course, scientific methods led up to it and followed it. Similarly in the realm of history, some thought that all the historian had to do was to collect and correlate his facts. But after he had collected his facts, from which all subjective bias must be excluded, he had to apply his imagination to them, or he was only a chronicler and not a historian at all. So in medicine, concluded Mr. Gilkes, there was a point beyond scientific studies where creative imagination came into play.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

Christmas Gifts Fund Appeal

Sir,—To receive a gift at Christmastime brings joy to everyone, but particularly to those who are lonely or in need. To none is a gift more welcome than to those who have fallen on hard times. We are very grateful to you, Sir, for your generosity in giving space for appeals for Christmas gifts for beneficiaries of the Royal Medical Benevolent Fund, and I am confident that you will continue to help in this way.

The beneficiaries include colleagues who have met with misfortune, and also widows and spinster daughters who are often in desperate need. I ask readers to give generously and to bear in mind that many of the widows are young women with children, the breadwinner having been plucked away before he was able to make provision for them. The Fund helps them by regular grants in aid, but an additional gift at Christmas sets their hearts aglow.

Contributions should be sent to the Secretary of the Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15, and marked "Christmas Gifts."—I am, etc.,

Webb-Johnson,
President,
Royal Medical Benevolent Fund.

Air Disinfection in Schools

Sir,—In your leader (*Journal*, September 25, p. 743) you comment on the Special Report of the Medical Research Council (No. 283),[1] which relates to the effect of indirect ultra-violet irradiation on the volume of illness among schoolchildren. You point out that "the main alternative to chemical disinfection is irradiation with ultra-violet light," and you appear to suggest that this investigation was necessary for the reason that chemical disinfection had failed to provide a solution to the problem of controlling air-borne infection.

This statement is based on a previous Medical Research Council Report (No. 262),[2] but as this was issued six years ago it seems desirable to refer to a considerable volume of evidence which has since become available. First, the laborious laboratory study by MacKay[3] provided convincing evidence that hexylresorcinol disseminated as a continuous flow aerosol by means of the "aerovap" installation "will reduce in a very short time the bacterial content of the air from over one million bacteria per cu. ft. of air to fewer than ten." Secondly, tested under the perfect experimental conditions of a static population in the monkey-house of the Dublin Zoo, this same apparatus has throughout the past five years eliminated upper respiratory disease, which, until then, had confronted the authorities with a serious problem. Thirdly, during the same period, extensive controlled observations have been made on some hundreds of State personnel in Dublin with most encouraging results in providing a considerable degree of protection against upper respiratory and presumably air-borne disease in spite of the disturbing fact (among others) that for some two-thirds of each 24 hours (and more during week-ends) such persons are exposed to the risk of infection of unknown amount and virulence.

It would be well, therefore, to accept with reserve any statements on this subject which are not shown to be based on at least the same volume of evidence and length of observation.—I am, etc.,

Dublin. Charles Dickson.

References

1 *Special Report Series, Medical Research Council*, No. 283, 1954. H.M.S.O., London.
2 *Special Report Series, Medical Rsearch Council*, No. 262, 1948. H.M.S.O., London.
3 *J. Hyg. (Lond.)*, 1952, **50**, 82.

The M'Naghten Rules

Sir,—Dr. Eliot Slater's article on the M'Naghten Rules (*Journal*, September 25, p. 713) presents a challenge which cannot be ignored. After a lucid exposition of the M'Naghten Rules he postulates the psychiatrists' dangerous doctrine of "no responsibility," which if applied logically would lead to crime being first excused, and later accepted as a variation of ordinary behaviour, and this would strike at the roots of the institutions of society.

In the illustration of the half-crown being found on the office floor, Dr. Slater states that the man who would make some effort to find the loser is the "unusual" person. Does he therefore condone dishonesty because it is "usual"? Would he regard as "usual" the bus passenger who alights without paying his fare? This also is an illustration of the blurring of the distinction between right and wrong, which would lead on to a lack of distinction between good and evil, and between crime and decent behaviour. If these ideas of the psychiatrist were spread through the community, people would say, Why should I bother to be unusual, especially as I stand to gain by conforming with usual behaviour? This is an unmoral attitude, and would result in the moral degeneration and corruption of mankind.

This attitude of psychiatrists to "responsibility, innocence, and guilt," and to "free will," is an attack not only upon the Common Law but an assault upon the moral law, and would form an insuperable barrier to the co-operation between the professions which is essential for the reform of the M'Naghten Rules.—I am, etc.,

Camberley, Surrey. Elaine Stewart.

Sir,—Dr. Eliot Slater, in his article on the M'Naghten Rules (*Journal*, September 25, p. 713), has stated that the common law and public opinion have not progressed while the study of mental disorders has, and he adds that the former are out of date. He says that the law has learned nothing, that lawyers are never loath to tighten the law, and that juries only address themselves as to whether or not the criminal is insane. He also claims that all medical men consider that certain mentally ill people are never responsible for their crimes. These statements are untrue.

I personally believe that capital punishment is an anachronism and should be abolished. But the article in question is not about the penalty but about the verdict of guilt; Dr. Slater does infinite harm in confusing the two issues. He insists that the study of criminal responsibility is essentially a scientific one, and this is so because our actions are all determined by circumstances and not by any moral or metaphysical factors. It is precisely this view which so many non-medical, and not a few medical, people dispute; we insist that "free will" is not "heuristically sterile," and in fact cannot at the present day be reduced to so-called scientific terms. It speaks much for the present-day trends in psychiatry when he says that "we do very well without such concepts as responsibility, innocence, and guilt."

When he goes on to say that only the unusual man would make an effort to find the loser of a half-crown if he found it, and that punishment consists in making arrangements *so that* disagreeable consequences follow, I would insist that his view of ordinary social behaviour is faulty. Quite certainly, no two people ever have the same motives and aims, even though they decide on the same punishment, for a culprit.

The problem of an individual's responsibility for his own acts is very complicated and difficult, not only because each individual is complicated, but also because the requirements of each community are also complicated. Dr. Slater's article has contributed nothing towards more genuine efforts to solve this problem.—I am, etc.,

Shortlands, Kent. W. J. Atkinson.

Appendicectomy in Chronic Appendicitis

SIR,—The paper by Mr. I. McLennan and Mr. J. K. Watt (*Journal*, September 25, p. 736) entitled "Justification for Appendicectomy in Chronic Appendicitis" appears to be the product of confused reasoning. The authors commence by reporting the lack of correlation between the pathological and clinical findings in chronic appendicitis, and then they show that appendicectomy has cured the abdominal pain in about 80% of their patients. This leads them to conclude that "chronic appendicitis is a clinical entity." In fact, it merely proves that laparotomy is often followed by recovery, but it does not explain why. However, it is just as likely that the powerful suggestive effect of the operation is responsible for the relief of purely functional abdominal pain. Whether or not it is justifiable is open to doubt, for they have not compared a series of appendicectomy cases with a group of patients who have been fully investigated with negative findings and then confidently pronounced fit. They might well have found that the results were as good and the morbidity of the operation (about 12% in their series) would have been eliminated. The fact that females outnumbered males by 3·2:1 and had a greater recovery rate (83.5% compared with 74.2%) lends support to the proposition that many of their cases were functional. Furthermore, it is difficult to explain why 15% of their "cured" patients should have had "minimal residual pain" when the alleged offending organ had presumably been completely removed.—I am, etc.,

Stock, Essex. IAN G. WICKES.

SIR,—The article "Justification for Appendicectomy in Chronic Appendicitis" by Mr. I. McLennan and Mr. J. K. Watt (*Journal*, September 25, p. 736) provides an instructive example of the "crooked medical thinking" recently castigated by Dr. R. Asher (*Journal*, August 21, p. 460).

The relief of abdominal pain following appendicectomy is cited as proof of the validity of a clinical diagnosis of chronic appendicitis. This is a logical absurdity. Are we to believe that when a histologically normal appendix is removed the signs of chronic inflammation have miraculously disappeared in the interval between diagnosis and operation? Is there any evidence that a simple skin incision under anaesthesia would not give as good results as appendicectomy or that the condition does not undergo a spontaneous cure within three to five years in the majority of cases? Have the authors considered other hypotheses? Their therapeutic results could be explained more plausibly by assuming that symptoms were due either to fear of developing acute appendicitis or a mistaken belief that the appendix was diseased.

Neither in common sense nor in logic can the results of treatment be held to provide definite evidence for any specific theory of aetiology.—I am, etc.,

London, W.12. E. K. WESTLAKE.

Acute Appendicitis in Childhood

SIR,—In reply to Dr. B. Stone's letter (*Journal*, August 28, p. 536) I am able to record that there was no delay in surgical treatment in any of the cases in the series I reported (*Journal*, August 14, p. 388). However, I inquired in the department if any such cases had been admitted during the last six years. I was informed that there had been three such cases in a total series of about 500. These cases bore marked similarity to Dr. Stone's in regard to age and apparent mildness of the abdominal pain of which the child complained.

Children under 3 present a real difficulty in diagnosis because they are unable to express their symptoms clearly, if at all. It is also clear that the abdominal pain of acute appendicitis at this age is often not dramatic to the onlooker, who may not be unduly alarmed. The explanation may lie in the relatively large size of the appendix in infancy, an obstructive lesion not being so absolute, or to early rupture of such an appendix. It is well known that acute pain tends to pass off when perforation has occurred. Another real difficulty is the uncooperative child who refuses to allow any examination unless heavily sedated, and in such cases early physical signs are unlikely to be of much value. In our experience, however, these circumstances are uncommon, and in the large majority of cases it should be possible to arrive at a correct diagnosis within the first 24 hours.

Dr. A. Koby (*Journal*, September 4, p. 593) stresses the importance of continuous pain. We are in agreement with this and would emphasize that persistent pain usually indicates some serious abdominal lesion. The absence of *anterior* abdominal tenderness does not exclude acute appendicitis, as indicated in Fig. 2 of the article already referred to, and, provided the patient is co-operative, flank tenderness and rectal tenderness must also be excluded. It is rare indeed, in a co-operative child, to fail to elicit a point of tenderness at some site in the abdomen.

If delayed diagnosis in three cases out of 500 is lower than other paediatric clinics in the country, as might be implied from Dr. Stone's letter, it is due to the great interest shown by my medical colleagues in surgical problems and their readiness to call for a surgical opinion in any case of real doubt.—I am, etc.,

Newcastle-upon-Tyne, 2. DENIS HINDMARSH.

Poisoned Nappies and Borated Talcum Powder

SIR,—I was surprised to find several inaccurate statements regarding boric acid in your annotation on "Poisoned Nappies" (*Journal*, July 24, p. 222). I have been interested in the question of boric acid in preparations applied to the skin for some time, and have read all the available literature regarding boric acid poisoning, but have been unable to find a single case which can be attributed to the use of a borated talcum powder. It is undiluted boric acid that has caused the poisoning in these cases.

Goldbloom and Goldbloom's case, mentioned by you, was subsequently shown[1] not to be due to use of borated talcum powder: the infant had a badly infected umbilicus to which powdered boric acid had been applied directly and without dilution of any kind—that is, another example of the misuse of boric acid. I think the position regarding the use of boric acid in talcum powders used in infant hygiene has been well stated by the United States Food and Drug Administration in their statement dated January 30, 1954, which says: "There is no hazard in the use of talcum powders with 5% boric acid. Borated talcum powders with 5% boric acid have been in use for many years as dusting powders for babies. Clinical, animal, and chemical research investigations, as well as consultation with leading medical authorities who have conducted research in the field of baby talcs, confirm their safety." In Britain, a 10% boric acid powder is used, but there has been no authentic record of poisoning with this preparation.

Your annotation also gives the impression that boric acid is incorporated in talcum powder only for its antiseptic properties, but this is, in fact, not so. Whilst it can be said to possess mild antiseptic properties, its main use is to neutralize the calcium oxide which is inevitably present in commercial talcum; the boric acid present converts it into the insoluble calcium borate in the presence of water. Any excess of boric acid remaining will be available to neutralize ammonia which may be present in the urine. Boric acid, too, serves to inhibit the growth of micro-organisms in the talcum powder during storage. No one would suggest boric acid alone for treating napkin rash. In my experience, the most effective agent is tyrothricin, either as an aqueous suspension of 1:1,000 or a cream with 0.5% of this antibiotic.

Many dermatologists and paediatricians would not agree with the suggestion that the expensive quaternary ammonium compounds should be substituted for borax in the washing of napkins, as, apart from the cost, which is a factor not to be ignored, they are certainly more likely to

cause dermatitis than boric acid or borax. In my hospital practice I am meeting, amongst the nursing staff, an increasing number of cases of dermatitis due to cetyl-tetra-ammonium-bromide. I do not know of any antiseptic which is both absolutely safe and 100% effective, so that at all times one should guard against the misuse of these agents. Mishaps will always occur, but I feel that the best way to avoid them is not by abandoning a long-established remedy because it has been abused, but by educating the user so that mishaps do not occur.—I am, etc.,

London, W.1. E. J. Moynahan.

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Underwater Swimming

Sir,—During the past few years interest in underwater swimming has grown apace and in this country led to the founding of the Underwater Explorers' Club in September, 1953. For the guidance of any practitioner who may be asked to advise a would-be diver as to his fitness for the sport, the following procedure has been based upon that of the Club Alpin Sous Marin.

A medical history and an *x*-ray negative of lungs and heart is taken, and a general clinical examination made to exclude the subjects of syphilis, phthisis, chronic bronchitis and emphysema, and those with a history of serious lung disease, including spontaneous pneumothorax (spasmodic asthma is not a contraindication), epilepsy, a tendency to faint, and organic and functional nervous disease, cardiovascular abnormalities (arterial pressures should be between the ranges of 160 systolic and 60 diastolic), thyrotoxicosis, marked deafness or unhealthy or blocked nasal passages. The subject should have a good exercise tolerance test, a chest expansion of 2 in. (5 cm.) (in a man), and the ability to hold the breath for 60 seconds and to inflate the drums by Valsalva's method. The weight should be between 132 and 187 lb. (60 and 85 kg.). Age is no bar.—I am, etc.,

London, E.C.4. R. N. C. Smith,
Medical Adviser to the Underwater Explorers' Club.

Methyl Chloride Poisoning at Sea

Sir,—Having had a case of methyl chloride poisoning at sea at the end of June, I was much interested to read of the case published by Dr. M. M. Macrae (*Journal*, May 15, p. 1134). In view of the widespread use of this refrigerant, and the considerable risk of poisoning from it, it is surprising that, as stated in the memorandum, only seven cases had been reported in Britain up to 1943.

It is used on many refrigerators of this ship, and when, as sometimes happens, the gas shows too high a pressure an engineer officer simply loosens a nut and lets the surplus escape into the atmosphere of the bar or store-room. Having done this operation on three refrigerators one day, an officer was brought to me the following day by his senior; one was taken aback to find the case already confidently diagnosed, and later to find that many of the storemen and barmen were quite familiar with the smell of the gas. Diagnosis could be almost certainly confirmed by the smell of the patient's breath compared with a sample loosed off for my benefit.

The symptoms conformed closely to those described in the literature, and to the case of Dr. Macrae, although mine was altogether a milder attack; giddiness, thick slurring speech, slow cerebration, vomiting (twice), nausea, somnolence. In this case the only mental effect was the complaint of peculiar dreams at night. Pulse rate was regular at 100, and delayed effects were shown by a rise of temperature to 100° F. (37.8° C.), and a moderate amount of albumin in the urine, both for the first time, on the fourth day. Two days later both were normal, all symptoms were gone in eight days, and two months later the patient is now quite well. Treatment given was sod. bicarb. and glucose drinks.—I am, etc.,

Sutton, Surrey. J. Crawford.

Stellate Ganglion Block in General Practice

Sir,—The article by Dr. R. Crosbie Walsh (*Journal*, September 18, p. 684) entitled "Stellate Ganglion Block in General Practice" prompts me to write suggesting a different approach to the stellate ganglion. The anterior approach suggested by Leriche and Fontaine[1] and very fully discussed by Naffziger and Adams[2] has always seemed to me too hazardous for general practice, and I have preferred a modification of the postero-superior approach suggested by Coleman and Bennett,[3] which also obviates the trouble with the carotid artery experienced by Dr. Walsh.

A lumbar puncture needle is inserted 6 cm. lateral to the spinous process of the seventh cervical vertebra and inclined inwards and forwards at an angle of 40° to the sagittal plane until the needle hits the upper surface of the first rib. The needle is eased forwards to the edge of the first rib and slipped downwards into the upper thoracic outlet for a further 1.5 cm. beyond the anterior border of the rib. About 4 ml. of 2% procaine is injected along the needle and a typical Horner's syndrome develops within a few minutes. If it does not do so within five minutes then further injections of procaine may diffuse through the retropleural areolar tissue and so infiltrate the sympathetic chain. The needle I use has been scored by an ampoule file at 1 cm. intervals to facilitate measurement of the depth reached. I find that after raising a preliminary skin weal with procaine solution there is no need to infiltrate along the proposed needle track except when a wider bore needle is used. In order to avoid daily injections I obtained from Messrs. Archibald Young, of Edinburgh, some wide bore needles, fine polythene tubing, and a heparin adaptor. The needle is inserted, and the polythene tubing fed down it. The needle is then withdrawn and the adaptor attached to the end of the tubing with collodion. The tubing can be left *in situ* for as long as may be required.

My series of cases is much smaller than that of Dr. Walsh, but my impression so far is that the earlier the treatment is instituted the better, and that injections should be given twice daily for a week, to both ganglia. With regard to the cases of stiff shoulder treated in this manner, Dr. Walsh may be interested in an article by the late Professor Archibald Young in the *British Medical Journal*[4] suggesting that the fall in polymorphs after ganglion block was due to the liberation of adrenergic substances, an interesting observation in view of the recent trend to regard the adrenals as the source of substances with an effect upon such lesions.—I am, etc.,

Rutherglen, Lanark. A. F. Nelson.

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Sir,—I read with great interest and pleasure Dr. R. Crosbie Walsh's short but competent communication on stellate ganglion block (*Journal*, September 18, p. 684). Although my personal experience (partly reported earlier this year elsewhere[1]) is not nearly as great as his, and although it is with the greatest diffidence that I venture to disagree with Professor Leriche's opinion,[2] I cannot say that Horner's syndrome must be obtained for a good result. Some of our successful cases never showed any sign of Horner's syndrome, nor was it a constant feature in all the injections carried out by the same operator on the same patient. Also, I cannot agree that improvement should occur within ten minutes of infiltration. Patients in my series vary greatly in this respect. Moreover, some cases who felt improved almost immediately after injection were in fact no better objectively in the final result.

The approach is an interesting variation of the classical anterior approach. I have also abandoned the latter in the more recent cases in favour of a lateral approach—i.e., inserting the needle at the anterior edge of the trapezius at the level of the thyroid cartilage, directing it 45 degrees

downwards and directly medially, aiming for the neck of the first rib. The usual solution used by me is ½% procaine without adrenaline, injecting 20 ml. each time. The full ideal course consists of 18 infiltrations; 15 (in three lots of five) on the side of the cerebral lesion, and three on the contralateral side.—I am, etc.,

Croydon. N. N. Iovetz-Tereshchenko.

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Detecting Lung Cancer

Sir,—I wish to add my unqualified support to the letter of Mr. F. R. Edwards (*Journal*, September 25, p. 752).

During the last ten years, first at the Liverpool Thoracic Centre and more recently at the Godalming Centre, I have spent many unprofitable hours examining preparations of sputum for evidence of malignancy. There have admittedly been cases where the bronchial biopsy or *x*-ray findings have not provided clear-cut evidence of malignancy, yet neoplastic cells have been found in the sputum, but such examples are very rare indeed. The condition causing the greatest confusion is, of course, chronic bronchial infection, particularly if squamous metaplasia is prominent.

The bronchial biopsy, when obtained by skilled hands under modern anaesthesia, is so simple and straightforward, and, if the tissue is submitted in mercury formol fixative, it is usually a simple matter for the pathologist to return a firm report within 24 hours. The diagnosis of peripheral growths *in situ* is, I feel, a matter for the radiologist rather than the histologist, once the blood count and W.R. have proved negative. The scalene-node biopsy occasionally yields positive findings, but often provides an indication of inoperability so that its use for early diagnosis is limited. It must finally be urged that the cytological examination of sputum should be the investigation positioned at the end rather than the beginning of the chain of diagnostic procedures, otherwise the proportion of inoperable cases of lung cancer is certain to increase.—I am, etc.,

Godalming, Surrey. W. K. Taylor.

Obstetric Anaesthesia

Sir,—General practitioners of Dr. A. H. Morley's generation (*Journal*, September 18, p. 702), and of previous and later ones of course, in the patients' own bedrooms have applied forceps, delivered difficult breeches, performed versions, removed placentas, dealt with placenta praevia. These they have done—with greater or less sweating—with the patient lying on her side under chloroform anaesthesia. If this anaesthetic was safe, as it was and is in such circumstances, why should it be dangerous in hospital? If the students are not taught to use it, how can they have confidence in using it afterwards? Is it possible that the teachers themselves are lacking practical experience?—I am, etc.,

Beckenham, Kent. W. Maxwell Penny.

Scrotal Pneumatocele

Sir,—Dr. R. A. Redd (*Journal*, July 24, p. 213) has described a most unusual case of scrotal swelling following induction of a pneumothorax, but I doubt if the term scrotal pneumocele is the correct one to use in describing this case. Scrotal pneumocele or pneumatocele, which is probably a more correct synonym as regards etymology, usually denotes air within a patent processus vaginalis.[1] It may be due to an already patent processus vaginalis, when the pneumatocele will follow induction of a pneumoperitoneum, or due to the weakly adherent walls of the processus being gradually forced apart, when the pneumatocele will appear after several refills. In either case the persistence of the pneumatocele will produce an indirect inguinal hernia, but often the lesion is self-limiting, possibly due to the irritating effect of the air.[2] An analogous condition in women, vulval pneumatocele, has also been described.[3]

In Dr. Redd's case it would seem more likely that the air lay in the interfascial planes of the scrotum than in the processus vaginalis. The absence of a pneumoperitoneum in the abdominal *x*-ray, the absence of a cough impulse and the irreducibility of the mass, the abundant evidence of surgical emphysema elsewhere in the body, and the presence of the testes laterally in the groins instead of below and behind the scrotal swelling would support this conclusion. The facts that an *x*-ray of the scrotum showed air in the right side and air could be palpated in the right inguinal canal are further evidence that this air was not in the processus vaginalis, as the latter had presumably been removed when a right inguinal herniorrhaphy was performed 25 years ago. It would therefore be more appropriate to call this a case of scrotal emphysema, which is the term Rankin and Judd[4] used to describe the case which Dr. Redd mentions. In the case of Rankin and Judd it was two weeks before the scrotal swelling disappeared—a striking similarity to Dr. Redd's case, but unlike the self-limiting type of scrotal pneumatocele, which usually disappears in a few days.[1 2 5]

It would appear to me that the factors which produced the early inflation of the scrotum are a little more complex than the description of the tissue planes due to the right inguinal herniorrhaphy—indeed, the presence of this scar might be thought to delay the appearance of air in the right side of the scrotum, yet it was this side which was first affected. The emphysema of the penis and perineal body was probably an extension of the subcutaneous emphysema of the abdominal wall, but this mechanism cannot account for the tense scrotal swelling, which was probably due to air between the coverings of the testes. It is possible that this air lay in the space between the internal spermatic and cremasteric fascias, because this tissue plane is continuous with that which lies between the transversalis fascia and the internal oblique muscle, and Peabody and Buechner[6] have shown that air superficial or deep to the transversus abdominis muscle can diffuse into the mediastinum. The radiological studies in this case show air in the muscle layers of the abdomen but not in the mediastinum. A negative *x*-ray, however, does not exclude mediastinal emphysema, for I have seen a case where surgical emphysema of the neck and a crepitant sound synchronous with cardiac systole occurred after a pneumoperitoneum refill, yet a chest *x*-ray taken 18 hours later was normal. After a pneumothorax induction air could reach the mediastinum via the interstitial tissue of the lung, and in this case we know that the lung was punctured. The speed with which the scrotum became inflated was probably due to the coughing of the patient, which forced the air into the lax tissues of the scrotum.—I am, etc.,

Singapore. David Burman.

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Pilonidal Sinus

Sir,—Much of the copious literature on pilonidal sinus and that part of your annotation (*Journal*, September 18, p. 694) evaluating the results of operative treatment leave me puzzled, since the conclusions are quite at variance with our own experience. During the post-war years we have dealt with what must be a representative consecutive series and yet we always achieve first-intention healing by primary suture. The technique we use is that described by Mr. J. B. Oldham,[1] and I have often wondered whether the numerous writings on different surgical treatments would not be greatly reduced if this valuable contribution was better known on both sides of the Atlantic. The principles embodied in this procedure are used every day in plastic surgery and reconcile complete excision with satisfactory repair provided minimal skin is removed. In the rare case where the sinus extends around the anal region primary closure would no doubt be out of the question, but we have never seen this form of pilonidal sinus.

Mr. Oldham's method of suture and anchor-dressing firmly apposes the sutured skin and subcutaneous tissue to the aponeurosis covering the awkward contour of the sacral groove and completely controls the strong tendency to form a dead space. The special deep sutures related to the three gauze rolls which lie across the large central gauze roll are tied first on one side. Drawing each roll over to the opposite side while the second series of deep sutures are tied has the effect of distributing tensions evenly over the whole area. Any method failing to obtain these effects results almost inevitably in a dead space filled with sero-sanguineous exudate and in harmful tensions. And then infection is not far behind in both the literal and metaphorical sense, thus accounting for many unsatisfactory results and no doubt for multiplicity of methods which have been advocated during the past few years. Pre- and post-operative treatment is important.[1] To be brief: acute infection must be quite settled before excision ; the skin is carefully prepared for three days before operation ; the bowels are confined for seven days after operation, which in practice is not such an ordeal as it sounds ; a sterile swab is kept tucked under the lower end of the fixed dressing and the surrounding skin is kept dry with daily application of methylated ether. When the sutures are removed in fourteen days a beautifully healed wound is the rule and in some of our cases no antibiotic cover has been given. We have found strongest monofilament nylon the most satisfactory material for the deep sutures. Needless to say a fine everting mattress suture is necessary for the skin edge.

Speculations on the aetiology are interesting but seem to have little pragmatic significance. It is the method that matters here, and the importance of a successful method of primary suture in this condition needs no enlargement. The difference between first- and second-intention healing to the patient means the difference between two weeks and anything up to three months under treatment quite apart from the discomfort of the open-wound technique.—I am, etc.,

London, E.11. D. LANG STEVENSON.

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SIR,—Your recent leading article on pilonidal sinus (*Journal*, September 18, p. 694) will help to win more ground for the acquired theory, but the congenital theory is well entrenched and still has eminent and influential supporters. Your brief historical review, however, omits one of the most significant developments in the study of this disease ; indeed you seem to deny its occurrence. The term pilonidal sinus was originally proposed by R. M. Hodges in 1880[1] in an article in which he not only described the condition accurately and completely but he also gave the reasons why he believed it was acquired and not congenital. He even alluded to the occurrence of similar conditions in other sites caused by the penetration of hairs. Hodges's term is still used: his theory was ignored and then forgotten. Although this point has been made several times before in the *Journal*—for example, Aird[2]—I venture to make it again, as it appears from your leader that the fundamental contribution of Hodges is not yet widely recognized.—I am, etc.,

London, W.1. B. H. PAGE.

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Propantheline and Enuresis

SIR,—Some of my colleagues in the medical profession may be interested in the details of two recent cases of mine where propantheline ("pro-banthine") was successfully employed in the treatment of enuresis.

Case 1.—Female, aged 24. This patient came to me on February 1, 1954, with a history of wet beds three or four times weekly all her life. A sound sleeper, she is the second of seven children, and was the only bed-wetter in the family. She had scarlet fever at 5 years old, and is of average intelligence and physical fitness. I prescribed propantheline orally, 15 mg. at 6 p.m. and 30 mg. at bedtime (approximately 11 p.m.) with no result. On March 22 dosage was increased to 30 mg. at 6 p.m. and 45 mg. at 11 p.m., since in the three weeks prior to this she had had 15 "nocturnal accidents." On March 28 she reported quite dry since her last visit; on March 30 she was wet once only, and on May 5 she reported quite dry. On June 1 she reported that she had not once been wet during the past two months, and on July 19 she reported that she had not taken the propantheline tablets for the past three weeks and asked to be taken off therapy. As a prophylaxis I suggested that she should continue to take 30 mg. at bedtime.

Case 2.—Male, aged 11. This boy was brought to me on February 9, 1954, with a history of bed-wetting every night since 1948. I prescribed propantheline orally, 15 mg. to be taken at 4.30 p.m. and 15 mg. at 7 p.m. On February 23 the patient returned and his mother reported three dry nights during the past fortnight. Dosage of propantheline was increased to 15 mg. at 4.30 p.m. and 30 mg. at 7 p.m. On March 13 the boy's mother reported six dry nights since his last visit to the surgery, but the supply of tablets had run out. On March 27 she reported that the boy was dry approximately every other night. On April 10 it was reported that the boy had had one week completely dry followed by a week with a wet bed every night. On April 24 it was reported that the boy was wet only three times in the past fortnight; on May 11 that he was wet only twice since the last visit, and on May 28 that he was completely dry since his previous visit. On June 11 his mother reported that he was wet on the nights of May 28, 29, 30, and 31, but not since. She stated that he had had a rather upsetting experience during that time. On June 29 it was reported that he had been completely dry since his last visit, and on July 19 that he had not been wet since May 31. The boy has now been wet only six times since May 1, and dosage with propantheline is being continued.

—I am, etc.,

Sunderland. B. GORDON.

Lowering Body Temperature

SIR,—I was greatly interested in the communication of Drs. H. H. Khalil and R. C. MacKeith on the above subject (*Journal*, September 25, p. 734), as having been partly responsible myself nearly forty years ago, during the first world war, for the adoption of a somewhat similar practice (highly successful, albeit more rough-and-ready!) which we carried out with the same object.

I well remember the appalling hot weather of 1917 in Mesopotamia (now known as Iraq), with daily shade temperatures at Basrah of over 120° F. (48.9° C.) for several weeks. Everything came to a complete standstill after tiffin, when all but the medical and the nursing services lay and sweltered. About 5 p.m. the ambulances began to roll up (for it meant certain death to try to move the sick into hospital any earlier) full of blue, unconscious, naked soldiers suffering from alleged heatstroke. These proved in reality to be cases of hyperpyrexial cerebral malignant tertian malaria ; and the medical officer in charge of the pathology laboratory would be all ready to take a blood-smear, while the orderly officer checked the AF.B256.

Desperate cases cried out for desperate therapeutics. For, still blue and unconscious, the patients were taken straight to the heatstroke-station. Here about a pint (570 ml.) of venous blood was withdrawn ; and for about 15–20 minutes they were rubbed all over with blocks of ice and given copious ice enemata. (For by 1917 we had become fairly well supplied with ice from an ice-plant on board a biggish boat lying in the Shatt-el-Arab.) Almost invariably we found that by this time the rectal temperature had fallen from 110° F. (43.3° C.), or 111° F. (44.5° C.), to about 102° F. (38.9° C.), that the cyanosis had disappeared, and that there was a marked improvement in the volume and tension of the pulse. And when a report from the pathology laboratory was rushed across at about the same time—"Pte. Atkins, T., MT rings ++"—a full dose of intravenous quinine completed the emergency treatment, and the patient was transferred to a bed in the appropriate ward.

It is a statistical fact that the mortality rate from this so-called hyperpyrexial heatstroke in July was 25.62%, and that when the ice-quinine treatment was adopted in August the rate fell to 11.76%, a drop of well over 50%.—I am, etc.,

Reigate. C. E. H. MILNER.

Piperazine in Treatment of Roundworm

SIR,—My recent experience with piperazine adipate in the treatment of roundworm infestation may be of interest. Roundworms are very prevalent in this district, a country practice with one small village. Eighty-seven cases of roundworm infestation have been seen in the past four

years. In contrast, approximately 15 cases of threadworm infestation have been seen. The age of the patients varied from 6 months to 64 years. The following preparations were used: piperazine adipate, santonin, hexylresorcinol crystals, and a proprietary preparation of iodochlorhydroxyquin.

Forty-two cases were treated with crystalline hexylresorcinol, five adults and the remainder children. Thirty cases (three of these adults) were traced six months later, and 70% of those appeared cured including the three adults. Of the 42 treated, it is significant that eight did not take the pills because of sickness, or else could not swallow them. Of the 22 taking santonin, seven were unable to continue because of sickness. Of the remainder, after six months 12 were cured, and there were 3 failures. Two cases were treated with iodochlorhydroxyquin, one adult and one child. Neither was sick, and neither was cured. Sixteen children were treated with piperazine adipate. All the children save one subsequently appeared cured. In all cases clinical cure was considered to be obtained when there was no subsequent appearance of worm in the faeces, and complete disappearance of the presenting symptoms followed. All the cases occurred in the very poorest of homes, with three exceptions. The average dosage employed was one tablet per day for each year of life in children up to 6 years of age. Children over 6 years of age were given two tablets three times a day. Administration is ordinarily continued for one week.

My experience confirms that piperazine tablets are effective in the treatment of roundworm infestation, and are well tolerated by the patient. In my opinion, their use constitutes the most satisfactory method of treating this condition.—I am, etc.,

Ovens, Co. Cork. JAMES REARDEN.

Statistical Significance of Biological Data

SIR,—I would like to make one or two statistical comments on Sir Ernest Kennaway's very interesting note (*Journal*, September 18, p. 663). The main difficulty in the kind of investigation he proposes is not to decide what is "statistically significant," but what is significant. A result is statistically significant if it reaches a conventional degree of probability according to some appropriate mathematical model, but the effect so revealed may be quite artificial. For instance, Tippett[1] quotes a correlation coefficient of −0.03 between head length and reaction time which is significant statistically but is almost certainly due to some irrelevant experimental error and scientifically quite insignificant.

I do not wish to imply that no useful work can be done with small effects but merely that the results must be interpreted with caution. An interesting example of a successful investigation of this kind was the demonstration of a lunar tide in the atmosphere referred to by Jeffreys.[2] One could also cite the use of complex experimental designs in agricultural research which can reveal very small differences in crop yield. These may not be very significant from the point of view of plant physiology, but are of considerable economic importance.—I am, etc.,

London, N.W.9. C. C. SPICER.

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Rubber Teat in Baby's Intestine

SIR,—Mr. G. Gordon Crowe (*Journal*, September 4, p. 579) states that he was able to find only one reference to this condition.[1] Actually, the accident is not very uncommon and was mentioned by me in the *British Medical Journal*[2] in 1950. As Mr. Crowe writes, it is just as well to bear the possibility of a swallowed teat in mind in these cases of obstruction in a young child.—I am, etc.,

Epping. FRANK MARSH.

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Obituary

F. WOOD JONES, M.B., D.Sc., F.R.C.S., F.R.S.

We record with regret the death on September 29 of Professor Wood Jones, honorary curator of the Hunterian Collection of human and comparative anatomy at the Royal College of Surgeons. In the world of anatomy and anthropology the name of Wood Jones stood supreme. Before he settled down in that great mecca of comparative anatomists in Lincoln's Inn Fields, he had travelled widely over the world—in Egypt and the Sudan, in Australia, in China, in the islands of the Indian Ocean and the mid-Pacific—and he had travelled also far backwards in time to probe deeply into the ancestry of man and man's place among the mammals. As a result of his wanderings and researches he wrote much that threw new light on these subjects, and also in a series of books in his later years propounded a philosophy based on his unique experience.

Frederic Wood Jones was born in London on January 23, 1879. He graduated B.Sc. at London University in 1903, and took the degree of M.B., B.S. and the conjoint diploma in the following year. In 1910 he obtained the D.Sc. in zoology; in 1925 he was made a Fellow of the Royal Society, and in 1930 a Fellow of the Royal College of Surgeons. His first appointments were as demonstrator of anatomy at the London and St. Thomas's Hospitals. In 1904 he went out as medical officer to the Cocos-Keeling Islands, between India and Australia, and there he met his future wife, Miss Gertrude Clunies, daughter of the governor of the islands, the late George Clunies-Ross. After this he was appointed anthropologist to the Egyptian Government, and took part in an archaeological survey of Nubia in the Sudan. In 1909 he was appointed lecturer in anatomy in the University of Manchester, but in the following year he was back in London, professor of anatomy at the London School of Medicine for Women. His work there was broken by the first world war, in which he served in the R.A.M.C. with the rank of captain. After the war he went back again to the antipodes, having been appointed to the chair of anatomy in the University of Adelaide, where he remained until 1926. From 1927 to 1930 he was Rockefeller Professor of Physical Anthropology in the University of Hawaii, and then he returned to Australia, this time to Melbourne, as professor of anatomy, succeeding Professor R. J. A. Berry. His occupancy of the Melbourne chair was interrupted by a period as temporary director of anatomy at Peiping (China) Union Medical College. In 1937 he came back to England, to the University of Manchester which he had left nearly thirty years before, now as professor of anatomy, and 1945 found him in London, the first Sir William H. Collins Professor of Human and Comparative Anatomy at the Royal College of Surgeons. He retired from this chair in 1951, having in the meantime been awarded the honorary gold medal

of the College, and he was appointed honorary curator of the Hunterian Collection. From 1914 to 1916 and again in 1919 he had been Arris and Gale lecturer at the College, and at various times he had acted as examiner in anatomy for the University of London, the English Conjoint Board, and the Society of Apothecaries.

Wood Jones was the author of many books, some of them of great importance and authority in his chosen field of research into human origins. Sir Gordon Gordon-Taylor, when he delivered the George Adlington Syme Oration to the Royal Australasian College of Surgeons in Melbourne in 1947, made an extended reference to Wood Jones's work, much of which was carried out in Australia, and declared that Wood Jones's monographs on the hand and on the foot should be in the hands of every student of anatomy and of every surgeon worthy of the name. A collection of his lectures on anatomy and anthropology was published in 1939 under the title of *Life and Living*. The last paper of his which this *Journal* published was the Heberden Oration of 1949. It was entitled "Classical Gout," and in the introduction he described himself as one who happened "to own a little private gout." He could also write with much charm as an essayist, investing scientific subjects with interest for the intelligent non-expert—witness his volume of so-called *Unscientific Essays*. A leading authority on coral formation, he also wrote informatively about sea birds. In 1942 he published a monograph upon scientific philosophy, entitled *Design and Purpose*, and a number of other works followed quickly during those years. In the latest of them, *Trends of Life*, published in 1953, he summarized the ideas which he had arrived at after a whole lifetime of study of living things. In this work he declared himself unashamedly unorthodox. His theme was that the distinction of living matter is its power of self-maintenance, manifested in activities that are characteristically directive, and that this basic quality of life had been concealed by the developments in biology inspired by Darwin's theory of natural selection as the main cause of evolution. Despite the note of pessimism which marked some of his writing, no one could dispute the great learning on which it was based nor the literary skill which he had at his command. He was gifted as an orator and teacher as well as an author. The last chapter of his career, his curatorship at Lincoln's Inn Fields, must have afforded him great satisfaction, and it was a rich experience to accompany him around his beloved museum and to listen to his talk which made the dry bones live.

We are indebted to Professor Gilbert Causey for the following appreciation: To those who have been in constant contact with him during the past year the death of Professor Wood Jones is the culmination of a prolonged illness borne with great fortitude and cheerful spirit. To the end his devotion to accurate observation was maintained. Sitting in his hospital bed, turning over the pages of a natural history magazine, he was quick to criticize and correct an erroneous caption.

His immense memory, combined with a facility with both pen and pencil, makes his many writings stimulating even when controversial. Such texts as "The Principles of Anatomy as Seen in the Hand" by their wide knowledge and stimulating presentation will long remain essential reading for all anatomists.

His later years at the Royal College of Surgeons have been marked by an unswerving devotion to John Hunter and his amanuensis William Clift. The last public lecture that Professor Wood Jones gave at the College was devoted to the reintroduction of John Hunter to his proper, elevated position in the history of the pioneers of geology and palaeontology. So deeply was he immersed in the Hunterian material and tradition that not long ago, while examining specimens from the collection, he commented that he could "feel" the presence and influence of John Hunter. Professor Wood Jones looked upon these specimens as "John Hunter's unwritten book," and said, "The collection of specimens constituting the Hunterian Museum is one of the most remarkable monuments that any man has ever raised to perpetuate his memory." By Professor Wood Jones's death the anatomical discipline loses a great protagonist and the Hunterian Collection one of its most devoted custodians.

Dame JANET M. CAMPBELL, D.B.E., M.D., M.S.

Dame Janet Campbell, who was among the most distinguished medical women of her time, died in London on September 27 after a long illness. She was 77 years of age.

Janet Mary Campbell was the daughter of Mr. George Campbell, a Brighton banker, and after attending the Brighton High School she went for a time to the Moravian school at Neuwied, in Germany. In 1896 she entered the London (Royal Free Hospital) School of Medicine for Women and graduated M.B., B.S. in 1901, proceeding M.D. in 1904 and taking the degree of M.S. in 1905. After qualification she held the posts of house-surgeon and house-physician at the Royal Free Hospital, and senior resident medical officer at the Belgrave Hospital for Children. She also took a postgraduate course in obstetrics at Vienna. Her first post in the public service was with the London County Council as an assistant school medical inspector, and in 1908 she became a medical officer to the Board (now Ministry) of Education. Her work there was outstanding, and in 1919 she was appointed chief woman medical adviser to the Board, after a successful struggle to obtain suitable status and pay for women doctors in this post—a success which provided a valuable precedent. Dr. Campbell, as she then was, worked closely with Sir George Newman, then Chief Medical Officer of the Board, in building up the school medical service. Physical training was one of her special interests, and she was responsible for a staff of physical training inspectors who visited primary and secondary schools throughout the country. In this field she was closely associated with the Dartford Physical Training College and was its guiding spirit, first as honorary secretary and later as chairman, during the difficult transition period that followed the death of its founder, Madame Osterberg. Among her special educational interests were the establishment of hospital schools for tuberculous children and the provision of courses of instruction in mothercraft. For a short time she was on the staff of Dr. Jane Walker's sanatorium at Nayland.

During the first world war she served on several government committees concerned with women's work, including the important War Cabinet Committee on Women in Industry, which published a valuable report in 1918. When in 1919 the Ministry of Health was set up, with Sir George Newman as Chief Medical Officer, Janet Campbell became one of the six senior medical

officers on his staff, while retaining an advisory post at the Board of Education. She was made a Dame Commander of the Order of the British Empire in 1924, and the University of Durham bestowed on her an honorary doctorate of hygiene.

At the Ministry of Health Dame Janet was in charge of the department, staffed by five women medical officers, which dealt with maternity and child welfare, as defined by the Maternity and Child Welfare Act of 1918, and still a new departure in the field of public health. In the extension of these services and their co-ordination with the many voluntary agencies which had been doing pioneer work all over the country, her clear mind, wide outlook, and administrative ability found congenial scope. She had, moreover, personal qualities which helped to make her work successful—a quick appreciation of varying points of view, and a sympathy with the difficulties alike of the voluntary workers jealous for the future of their work and of the local authorities and their medical officers of health, many of them keen to carry out their new responsibilities. Her personal charm and unfailing courtesy and patience were great assets in such work. At a later stage she was closely associated with the Ministry's inquiries into the causes and prevention of maternal mortality and morbidity, including the establishment of a departmental committee on the subject. She also paid special visits to America and Australia on behalf of the Ministry to report on maternity and child welfare services and on medical education. She was the author of numerous official reports on such subjects as the teaching of obstetrics and gynaecology, the training of midwives, maternal mortality, and infant mortality.

Those who worked in her department found her an admirable chief. She outlined clearly the work to be done, and left her assistants to do it, and yet was always ready with advice and support if real difficulties arose.

In December, 1933, she left the Ministry to marry Mr. Michael Heseltine, formerly Registrar of the General Medical Council, who died in 1952. From 1930 to 1936 Dame Janet was a member of the League of Nations Health Committee, and after her retirement from the Ministry of Health she served on a number of B.M.A. committees. She also took a very active part in the work of the Medical Women's Federation, of which she had been a member since its foundation in 1917, and served successively as honorary secretary, vice-president, and president.

C. McI. MARSHALL, M.B., F.R.C.S.

We record with regret the death on September 21 of Mr. C. McI. Marshall, the well-known obstetrician and gynaecologist. For the following tribute we are indebted to Professor T. N. A. JEFFCOATE:

When Charles McIntosh Marshall died at his home in Liverpool on September 21 at the age of 53 years, a bright light in the field of obstetrics and gynaecology was extinguished. Marshall was one of the quite large band of New Zealanders who, settling in this country, have achieved fame and distinction in medicine. His home city was Invercargill, where he was brought up in a strong Nonconformist atmosphere and where at school he won the prizes in arts rather than in science. He came to London with the aid of a Dominion Scholarship, having graduated in medicine at the University of Otago in 1923. His first appointment as house-surgeon at the Dreadnought Seamen's Hospital, Greenwich, where he worked with Mr. E. T. C. Milligan, explains his subsequent interest in both Lord Nelson and proctology, while his association with Mr. Canny Ryall at All Saints' Hospital endowed him with unusual knowledge and skill in female urology. He also held senior resident posts at the City of London Maternity Hospital and the Chelsea Hospital for Women, where he was influenced by Mr. J. A. Willett and Mr. Victor Bonney. He was elected a Fellow of the Royal College of Surgeons of England in 1928.

His career in Liverpool began in 1932, when he was appointed to the newly created post of resident obstetric assistant and registrar at the Liverpool Maternity Hospital. To say he made a success of the appointment is an understatement. He conquered any local prejudice and conservatism by results, and by the time he was appointed to the consulting staff at the end of three years he had revolutionized the practice of the hospital. So quiet was the revolution that many of us hardly realized it was taking place, and it is only in retrospect that it is possible to appreciate how much Marshall directed thought and practice, not only locally but throughout this country and beyond. Sometimes this was done directly, often it was accomplished indirectly by colleagues who almost inadvertently acted as his mouthpiece. Indeed, every article on practical obstetrics which has come out of Liverpool in recent years bears his imprint, although it may stand to another author's credit. His influence increased throughout the years as more and more of his associates recognized his knowledge, skill, clarity of thought, integrity, and far-sightedness, and realized that, although they might violently disagree with his views at one time, they and most others would be accepting them a few years hence. It is not too much to say that Marshall was one of the fathers, if not the father, of modern obstetrics in this country. His children included all those who had eyes which were prepared to see, those who had reasons with which to reason, and those who were sufficiently free from prejudice to appreciate even if not accept his detached logical standpoint. They included, too, a host of resident medical officers, nurses, and midwives, in all of whom he took a personal and individual interest and who in turn were devoted to him and carried his gospel far and wide. His own mind was always open to new ideas and his acute intellect was for ever probing every aspect of a problem before reaching a conclusion.

In 1939 Marshall published his book on *Caesarean Section —Lower Segment Operation.* It is a classic and reveals the man—his scholarship, accuracy, attention to detail, and interest in anatomy—and it contains personal results which have never been surpassed. Strangely enough, in this country at least, this achievement rendered him a disservice, for many outside observers gained a lasting impression that his obstetrical skill and interest were limited to this operation. Nothing is farther from the truth. When he arrived in Liverpool he found lower-segment section already well established. He adopted it, developed it, and popularized it, and he even advocated that its scope should be widened, but only in the treatment of those conditions in which he had proved to his own satisfaction (and he was not easily satisfied) that it offered better prospects for the mother and child than any other procedure. In fact he was reasonably conservative in its use and was a master almost without rival at the long-established vaginal manœuvres. Marshall reduced the foetal death rate in breech delivery at his hospital from the old standard of 20 or 25% down to 3 or 4%, and saw to it that it remained at or below this figure during the ensuing 20 years. He was one of the first in this country to use Kielland's forceps as their inventor intended them to be used,

and to recognize the place of the "prophylactic" operation. He was foremost among those advocating almost routine forceps delivery of the aftercoming head. He introduced the Blond–Heidler method for decapitation, and he was advocating early manual removal of the placenta and oxytocics during the third stage of labour while most obstetricians were afraid of such procedures. He carried Willett's forceps to the North and then quickly abandoned them to demonstrate that the best results in all but the minor degrees of placenta praevia could be achieved by lower-segment caesarean section.

Nowadays much is heard of the perils of anaesthesia in midwifery; these were recognized and emphasized by Marshall 15 to 20 years ago, but his warnings fell largely on deaf ears. His name along with that of J. W. Burns is always associated with a method of delivering the aftercoming head. This is well known, but how many realize that it was Marshall more than any one man who was responsible for the now general acceptance of the much more important matter that a frank breech is easier to deliver than a full breech and that extended legs should not be "brought down"? He conceived the idea of trial of labour in cases of breech presentation but did not live long enough to see it accepted. There is no obstetric operation, no matter how old or how new, of which he did not know and which he had not tried out personally. There was hardly an aspect of operative obstetrics to which he did not make a significant contribution.

Marshall often said that the technique and history of obstetrics was his hobby, and it is as an obstetrician that he deserves permanent recognition. Yet he was also in the front rank of gynaecologists, a member of the consultant staff of the Women's Hospital, Liverpool, and several other hospitals on Merseyside and in South Lancashire, with an extensive private practice. He was a loyal and proud disciple of Victor Bonney, so that his surgical prowess was a joy to behold and his knowledge of applied pelvic anatomy remarkable. His special interests were radical surgery for malignant disease and for stress incontinence of urine, and he was for ever improving his technique. He designed new operations or, as he would say, modified and resurrected the old. For his acquaintance with both obstetrical and gynaecological literature was so great that he never fell into the error of thinking that he had discovered or described something original, and many an inventor of a supposedly new operation was saved loss of face by a timely and kindly note of its previous description in some possibly quite obscure journal. Marshall learnt German at a comparatively late age to ensure a wider cover of the literature and became so proficient as to be able to write and lecture in that language. Anyone who cared to consult him on the most abstruse, legendary, or historical point pertaining to obstetrics and gynaecology could count on receiving prompt and reliable information.

Marshall's contributions to medical literature were many, but he could never write to order. He wrote only when the spirit moved him and when he had something in mind which he felt must be said, so that much of his work went unrecorded. In the same way, although he attended scientific meetings regularly, he avoided speaking unless there was something about which he felt so strongly that it became to him morally urgent that he should not remain silent. Never did a man see, read, or hear so much which he knew to be factually wrong or inferior without pointing out the error lest it cause the author embarrassment. Moreover, he was nervous and diffident, so that when he did speak publicly he did not always do his views justice. But he wrote well, for he was a lover of the written word and the beautiful diagram.

During the last 25 years of his life, at any rate, Marshall lived almost entirely for obstetrics and gynaecology. He hardly ever took a holiday except to visit European clinics and browse in European bookshops. However, he read widely, enjoying the psychological subtleties of Simenon's detection at one moment and the grandiloquence of Churchill's *Marlborough* at another. Even cookery books appealed by way of their polish and artistry, and that at a time when he was so ill that food itself was of no interest. He spent much time and money on cinephotography, and his collection of films illustrating obstetrical and gynaecological technique—mostly taken by himself or by an untrained bystander acting on his instructions—is probably the best in the country. Very occasionally this hardworking man slipped away secretly to watch a cricket match, and few would ever have guessed that in his earlier years he had been a fine cricketer himself.

A traditional obituary notice would give an account of Marshall's early life and doings, but of this I know little, for of himself he rarely spoke. It would also include detailed mention of his writings, distinctions, appointments, and society memberships. It would certainly note that Marshall was an active and inspiring member of the Gynaecological Club; that he was twice specially invited to lecture in the U.S.A., once to give the Joseph Price Oration; that he was an honorary member of the American Society of Obstetricians, Gynecologists, and Abdominal Surgeons; that in 1951 he was visiting professor in Cairo and Alexandria; and that he was several times invited to lecture in Germany, Austria, and Czechoslovakia. These and the like would provide some evidence of the important place he had achieved in the world of obstetrics and gynaecology, and they would also illustrate that, like so many others before him, his greatness was more often appreciated far afield than it was nearer home. Such details, however, give little indication of the real value of his work and, as a measure of the man, they now appear insignificant.

Marshall was shy and reserved, sometimes to the extent of appearing awkward. He was sensitive, sensitive to criticism among other things, although he rarely showed it. He did not shine at polite conversation, for insincerity was far removed from his character and he either remained silent or said what he honestly believed. If his talents were not always appreciated it was to some extent his own fault. He could retire into his shell harbouring real or supposed grievances. When his views aroused strong reactions among more conservative colleagues he often did not trouble to justify them, for he himself knew that his convictions were firmly founded on personal experience, reading, and prolonged and careful thought, and with that he was content.

Marshall suffered fools silently but not gladly, yet his natural inclination was to think well of others and to make allowances. If he could say nothing good of them he said nothing at all. He knew the pitfalls of medicine and surgery too well to criticize a colleague's management of a case, and his own good results he attributed to fortune rather than to his skill. He encouraged rather than upbraided his juniors. He saw their good points and forgave the bad.

Except for his few intimates Marshall was difficult to know and to understand during his earlier years in Liverpool when he had to struggle to achieve a position among comparative strangers. As the years went by, however, and as he became established in his rightful place, the hard shell which could hide his generous and loving nature cracked and softened to reveal his true worth, and to many he became Charles instead of Marshall. In this change his wife Nora, whose quiet and loyal devotion to him has been the admiration of all, and their two children, played a large part.

It would be fair to say that Marshall was an individualist rather than a team man. He did not relish the menial tasks that always fall to one member of a team at some stage in his career, and here he suffered the misfortune that his years and experience were always ahead of his professional status on paper. Yet this so-called individualist was never guided by self-interest—his main concerns were to foster obstetrics and gynaecology and to further the interests of the hospitals and medical school of the city of his adoption. The prestige of the Liverpool Maternity Hospital in the eyes of those that matter was his particular pride and joy, and he took it upon himself to see that every new

member of the staff maintained the high standard of service to the patient which he himself had first set. He was proud of his connexion with the Liverpool University Medical School, and even if he sometimes found undergraduate teaching irksome he carried it out as part of his determination to serve the school in every possible way. The graduates he taught by example rather than by preaching.

Those who failed to see greatness in him during his active life could not have failed to do so during his last illness, though again he wished to see only those to whom he could talk naturally and honestly as he had always done, and who would not be embarrassed by the fact that he knew that there could only be one outcome to his disease. His lifelong attribute of courage was with him to the last, and a visit to him when he was stricken was not a sad but an exhilarating experience. He calmly accepted that he had only a few weeks to live and continued to read the history of obstetrics, to write a paper, to discuss new ideas and recent articles, and to plan the future of his junior colleagues. In sickness as in the operating theatre or the delivery room he presented the figure of a great man, considerate for his guests as at all times, free from selfishness, self-pity, or complaint. This scholarly man who during his lifetime had taught us so much midwifery had, at the end, one more lesson to teach, and that how to die.

GUNNAR HOLMGREN, M.D.

Dr. Nils Gunnar Holmgren, emeritus professor of otolaryngology at the Karolinska Institute, Stockholm, died on September 6 a few weeks before his 79th birthday, which would have been celebrated on September 27. During an active professional life of great distinction he became the acknowledged leader of Scandinavian otolaryngology and one of the leading figures in this field in the world. His energy and administrative ability led to his playing a prominent part not only in Swedish but also in Scandinavian medicine.

Born in Upsala in 1875—his father was professor of physiology at the University of Upsala and his mother prominent in Sweden as a feminist—he qualified as a doctor in 1903 and proceeded to the degree of M.D. six years later. After holding the appointment of director of the new ear and throat clinic at the Sabbatsberg Hospital, he became the first professor of otolaryngology at the Karolinska Institute, Stockholm, in 1912, a post he filled with great distinction until 1940. In 1912 he founded at his own expense *Otolaryngologiska Meddelanden*, which four years later was renamed *Nordisk Tidskrift för Oto-rino-laryngologi*. In 1916 the name was changed again to *Acta Oto-laryngologica*, the journal then becoming international in scope. It was the first of the many *Actas* now published from Scandinavia, and he remained its editor-in-chief until his death. He was also one of the founders in 1929 of *Nordisk Medicinsk Tidskrift* (Scandinavian Medical Journal) and editor of that journal and of its successor *Nordisk Medicin* (first published in 1939), which under his guidance soon became the leading general medical journal of Scandinavia. Medical editorship ran in Gunnar Holmgren's family, for he was the brother of Israel Holmgren, the distinguished editor of *Acta Medica Scandinavica*.

During the first world war it was due to Gunnar Holmgren's efforts that the Hungarian otologist and Nobel Prize winner, Robert Bárány, was released in 1917 from a prisoner-of-war camp in Russian Turkestan and allowed to be domiciled in Sweden, where he eventually became professor of otolaryngology in Upsala. Bárány stimulated Holmgren's interest in the relief of deafness due to otosclerosis by surgery, so that for the subsequent twenty years Holmgren persevered in this field with occasional success, until the further development of this work by Sourdille of France and finally by Lempert of America made this into an established and successful procedure—which justified Holmgren's foresight and fortitude in reviving and persevering with the work despite poor results at first.

Holmgren was rector of the Karolinska Institute from 1933 until 1939, and during this time the new institute and hospital were designed and built. He was also for a period president of the Royal Academy of Science in Sweden, and in 1947 he founded and became president of the International Conference of Audiology. Such achievements as these were made possible only by his energy, fixity of purpose, administrative ability, and, above all, great personal charm. All who met him realized that they were in the presence of a great man—though he always made the humblest visitor feel most welcome. To English visitors he was particularly gracious, and one of them remembers how in 1938 Gunnar Holmgren was loud in his praises of Winston Churchill, whom he described then as England's greatest statesman.

He received many honours from Sweden and the other Scandinavian countries and was an honorary member of many medical societies throughout the world. For relaxation he turned, like many British doctors, to gardening, and in his country home he planted an avenue of trees, each one being named after a famous otolaryngologist. He was married three times and is survived by his widow and two sons.

DAVID FETTES, C.B.E., M.B., F.R.C.S.Ed.

Brigadier David Fettes, formerly consulting surgeon to the Army, died at Weymouth on September 24 aged 63.

David Fettes was born at Aberdeen on March 18, 1891, and was a medical student at Aberdeen University, where he graduated M.B., Ch.B. in 1914. He joined the R.A.M.C. almost immediately and served throughout the first world war in France and Salonika, being mentioned in dispatches. For some years thereafter he was in India, being again mentioned in dispatches for his work with the Marri Punitive Force in Baluchistan in 1919. It was from this time that he began to build up a reputation as a surgeon of sound judgment, and he took the F.R.C.S. of Edinburgh in 1928, being at that time a major. During the last war, in 1941, he was appointed consulting surgeon to the British Forces in Iraq and Persia. He held a similar post in the Western Command in 1944, and in 1945 became consulting surgeon to the British Army of the Rhine. He went to the War Office later in the same year and remained there until his retirement early in 1950. Created O.B.E. in 1937, he was appointed Honorary Surgeon to the King in 1945, and promoted to C.B.E. in 1949. After his retirement he went to live near Weymouth, and became consulting surgeon to the West Dorset Group of Hospitals. He is survived by a widow and a son.

We are indebted to Sir Heneage Ogilvie for the following appreciation: I first met David Fettes in the Middle East in 1942, when he was consulting surgeon to the adjacent Persia and Iraq Force, and I kept in touch with him till his death. I had an admiration for him as a surgeon and an affection for him as a man that I would confess to feeling for few people.

In Egypt, Palestine, and Syria we visited hospitals together, and I can never be sufficiently thankful for all that

he taught me. We examined problem cases, we discussed the many matters of surgical method and administration that were facing us at the time in a war of rapid movement when chemotherapy was just being born, and the still more difficult ones that would arise if (as then seemed very likely) Stalingrad should fall, and our two armies would be combining to check a thrust to the South and East. Later I worked with him when he was consulting surgeon to the War Office. He was an admirable surgeon. He was an excellent operator, sure and gentle. He was a first-rate clinician, careful in examining, judicial, wise in his advice, yet always ready to ask the opinion of others with a diffidence that was a little alarming till one knew that it was the sincere expression of a genuine modesty. Because he was such a good surgeon, because he brought to his task the specialized knowledge of a soldier, because he was such a charming man, so kindly, unselfish, and sincere, he was the ideal consulting surgeon—a post that demands just these qualities. He will be missed by all those who were privileged to know him as a colleague or to work under him in Persia or at Millbank, and by none more than me.

D. C. B. writes: It is fitting that tribute should be paid to a man of character to whom the cause of surgery in the Army owes a great debt. David Fettes became consulting surgeon to the Army in 1946 and retained that office until his retirement in 1949. When he took over, the Army was in the throes of demobilization and the experienced surgeons of the war days were returning to their posts in civil life. The military population at risk, however, was as large as ever, and the Army still had on its hands minor shooting wars all over the world. The demand for surgical replacements was vociferous, and it was clear that sooner or later the supply of surgeons of experience liable for military service would dry up. It was also clear that unless the Army offered to young doctors the opportunity of equipping themselves to practise specialist surgery it would fail to attract those who might otherwise be prepared to consider a Service career. While, therefore, Fettes welcomed those men from civil life who had still to do their national service, he gave all his support to the plan that the Army should train its own surgeons on a scale larger and more thorough than had ever been attempted before. This plan was executed partly in the Army itself and partly in civilian hospitals, through the ready and generous co-operation of consultants and specialists lately returned to civilian practice. As a result there came into being a corps of trained younger regular surgeons whose well-being and contentment were his first consideration, and in the later years of his office and in the years of his successors—when surgical cover was dangerously thin on the ground—the Army surgical services could not have survived without the officers trained under this plan. The standard by which he, as consulting surgeon, measured his policies was always the same—whether surgery in the Army would be improved thereby. This was completely in accord with all that had gone before in his surgical life, for his own very personal objective was to "give a square deal in surgery to the soldier and to his family." In the pursuit of this ideal he never failed.

The Army finished the war with the relationships between surgeons in civil life and surgeons in the Services more closely and highly developed than ever before, and it was Fettes's pride to cement these relationships, a task in which he was eminently successful. Soon after the onset of his last illness he was to his great regret unable to be present on that night in Millbank when the R.A.M.C. "dined out" its Honorary Consulting Surgeon, Sir Heneage Ogilvie, and welcomed Sir Arthur Porritt in his stead; but he seized the opportunity to write his feelings to Sir Heneage and through him to numberless other colleagues, and emphasized anew the need for a continuation of the closest collaboration between the Service surgeons and their friends and colleagues in civil life.

Fettes was a disarmingly quiet and unassuming man, and this on occasion brought about the discomfiture of the pompous or the unobservant, who would find themselves suddenly on the brink of a yawning gulf when they thought they were on solid ground with him. When he passed to the offensive, his weapon was the rapier, but so fine was the point that it pricked and never wounded. Every young man striving to fit himself professionally for a career in surgery or in the allied subjects which came under his direction was always certain of a welcome and all the help he could give.

Fettes will be missed by many now scattered in civilian life throughout this country and the Dominions, but his example will serve as a model for many of his younger colleagues in the Army, who will grieve for the passing of a friend. His many friends will sympathize with his widow and his son.

D. J. R. S. writes: Brigadier David Fettes came to West Dorset in 1950 to resume clinical work after a long and distinguished career in the R.A.M.C. This change of environment and work, at an age when many men are thinking of retirement from active surgery, might have seemed an alarming prospect, and the pitfalls inherent in such a change prohibitive of success. In fact, Brigadier Fettes effected this metamorphosis with complete success, at the same time gaining the respect and affection of his colleagues and patients. "The Brig.," as he was affectionately known, was indeed the personification of all the virtues that used to be considered requisite in a "doctor"; he was a man of humanity, humour, and humility, three attributes that, allied to his sound clinical abilities, made him a delightful colleague and both doctor and friend to his patients. We shall miss him for his friendliness; we shall miss him for his unselfish and ready co-operation; but we shall be inspired by the memory of a man whose roots were in a generation more elegant than the present, a man who seemed untouched by the harsh vulgarities of the post-war world and its perverted sense of values, a man of complete integrity and charm. Such is our loss and such our gain.

H. R. D. SPITTA, M.V.O., M.D.

Dr. H. R. D. Spitta, formerly bacteriologist to the Households of Edward VII and George V, died in St. George's Hospital on September 30, aged 76.

Harold Robert Dacre Spitta was born on November 3, 1877, the son and grandson of doctors who practised at Clapham Common in South London. His father, Dr. Edmund J. Spitta, was an expert in microscopy and the author of monographs on that subject; this may have directed his son's energies into bacteriology. After leaving Framlingham College Harold Spitta became a medical student, winning several prizes and scholarships. At St. George's Hospital he held the Webb Scholarship in bacteriology from 1898, and he graduated M.B., B.S. at Durham University in 1900. A year later he obtained the Cambridge D.P.H. and proceeded M.D. in 1902. He never contemplated general practice as a career, but after graduation worked as a keen pupil of the late Dr. Charles Slater, bacteriologist at St. George's Hospital, and one of the first medical men to specialize solely in that infant science. Spitta was appointed lecturer in clinical pathology and assistant bacteriologist at St. George's in 1902: he was also curator of the Pierse–Duncombe Laboratory there. From 1907 to 1912 he was examiner in bacteriology and public health to the English Royal Colleges, and among the other hospitals to which he was attached were the General Lying-In Hospital, the Grosvenor Hospital for Women, St. Mark's Hospital, and King Edward VII's Hospital for Officers. In addition he was bacteriologist to the Metropolitan Police. He had been bacteriologist to the Households of Edward VII, Queen Alexandra, and George V, and he was made a Member of the Royal Victorian Order

in 1914. During the early part of his career he was the author of numerous articles on bacteriological subjects and was a contributor to Latham and English's *System of Treatment*.

At the time of his death Dr. Spitta was the senior council member of the Royal Medical Foundation of Epsom College, of which he had been chairman for several years, after serving for an even longer period as chairman of the executive committee. His interest in the College was unfailing; by an odd coincidence his father's partner, the late Dr. H. R. Mosse, was an old Epsomian, who, when he died in 1942, bequeathed a substantial legacy to found a leaving exhibition there. Dr. Spitta married Sybil, daughter of the late Colonel Salusbury Crookenden, who survives him.

C. G. ROBERTS, M.D.

Dr. R. A. HICKLING writes: The news of Dr. C. G. Roberts's death in Australia (recorded in the *Journal* of September 25) at the age of 48 is a very sad blow for great numbers of friends here and in Australia. He had a very happy facility for getting on with everybody, and in particular with trade union representatives. He also had a gift for lecturing and held many courses in first aid, as well as lecturing on industrial disabilities and on the results of analysing sickness absence records. He was recently offered a post under the New South Wales Government as adviser in industrial health and was released by the Treasury to take up this important work. Cecil Roberts was a Territorial Army officer from the time he left Cambridge; but his position as a member of the headquarters staff of the Post Office medical service at the outbreak of war made the authorities retain him in civilian life, and he served throughout in London. He was very proud of the fact that he was on duty in the City during the wartime great fire of London. He was a man of a delightful personality who made friends everywhere, and he took great interest in helping to establish convalescent homes for Post Office workers in different parts of the country. He is survived by a widow and two sons, the elder of whom is at an officer cadet training unit in Australia and intends to make the Australian Army his career.

A friend and colleague writes: It was with great sorrow that I learned of Cecil Roberts's death in Australia. It was my privilege to work with him during the early war years as a very new recruit to the Civil Service. In those days the Post Office medical service was still responsible for the treatment of Post Office employees, and he and I worked side by side in the medical department, which was then underground in an air-raid shelter. It was very evident that Dr. Roberts's clinical skill and cheerful optimism did their part in maintaining the very high morale which was such a conspicuous feature of the Post Office in Central London during those years. I feel certain that many patients remember him with great affection and have cause to be grateful to him.

Cecil Roberts was an enthusiastic worker, and he brought to his duties not only clinical knowledge but the advantage of the scientific background which was the result of his early training at Cambridge. I personally am indebted to him for many thoughts and suggestions which undoubtedly orientated my view towards industrial medicine. It is no exaggeration to say that one could not have lunch with him without going away with some original suggestion on an aspect of industrial medicine, for he shared his thoughts and ideas generously with all his professional friends. He was the last of the chief medical officers of the Post Office, and with unselfish devotion he guided the department through a most difficult transitional period. His early death leaves a gap in one's professional friends which cannot be filled, and a sense of irreparable loss that he will no longer be there enthusiastically to discuss the problems which are constantly arising in the branch of medicine he practised.

Dr. J. R. HANNA died at his home in Jersey on August 31 at the age of 53. John Ridgway Hanna was born in 1901, the only son of the late Mr. Justice Hanna, K.C., and was educated at Shrewsbury School and at Trinity College, Dublin, where he graduated M.B., B.Ch. in 1928. After holding a resident appointment at the Rotunda Hospital, Dublin, he settled in Jersey in 1930 and went into partnership with the late Mr. A. E. Hind. In the following year he was appointed physician at the Jersey General Hospital, but because of increasing ill-health he was obliged to give up his general hospital work. In 1947, however, he became a physician to the geriatric hospital, an appointment he held until his death. An active member of the British Medical Association, Dr. Hanna was honorary secretary of the Jersey Division from 1932 to 1937 and chairman in 1947–8.

We are indebted to Mr. A. C. HALLIWELL for the following appreciation: John Hanna was popular both with his patients and with his colleagues. He was a good host with a cultured knowledge of food and wine, a witty after-dinner speaker, and always in demand to reply to the toast of the guests at the annual medical society dinners. In his younger days he was a first-class swimmer and gave the Hanna life-saving cup for annual competition between junior pairs. But he will be remembered most for his work with the St. John Ambulance. He started as a lecturer soon after he settled in Jersey, and in 1934, when the local brigade was formed, he was appointed divisional surgeon. Two years later he was given the honorary title of county surgeon. During the occupation of the island by the Germans in the last war his inspiration and enthusiasm were largely responsible for the efficiency of the brigade, and he persuaded the German commandant to allow the members to wear their uniforms. Soon after the war Jersey and Guernsey were given county status in the Order of St. John, and Dr. Hanna became the first county commissioner for Jersey. He was appointed an officer in the Order of St. John of Jerusalem in 1946 and later became commander in the Order. He carried on with his work to the end and earned the admiration of his friends by his refusal to admit that he was ill. To his widow we extend our sympathy.

Dr. TOM WALLACE, who died in the Cardiff Royal Infirmary on September 9 after a short illness, was a well-known general practitioner in Cardiff. He was 62 years of age. Born at Kirkshill, Ballymayo, Northern Ireland, in 1892, he was educated at Coleraine Academy and Queen's University, Belfast. The first world war interrupted his studies, and he served with the Royal Irish Fusiliers from 1914 to 1917 on the Western Front. In 1918 he graduated M.B., B.Ch., B.A.O., and in the following year he settled down as a general practitioner in the centre of Cardiff, where he remained until his death.

C. C. R. D. writes: No better type of general practitioner could ever be found than Tom Wallace. A man with a great personality and of outstanding character, he could not have failed to establish a large and successful practice, and his patients admired and loved him. He had no use for subterfuge, and inspired confidence wherever he went. In addition, he was a wise counsellor and, equally important, a great judge of character. These qualities combined with real professional skill are seldom met with to-day, and he will be greatly missed by all who knew him. In a tribute published in the *Western Mail* he was described as one of the fast-vanishing types of the old-fashioned family doctor. In 1950 the Cardiff Medical Society appointed him its president. His practice included the appointment of medical officer to H.M. Prison, Cardiff—a post for which he was well fitted. Bluff and blunt in manner, he had a heart of gold and every prisoner was treated with care and consideration. His medical evidence in court, and in criminal trials in particular, was always highly valued. His professional attainments were more than equalled by his athletic prowess. A fine rugby footballer, he played three times for Ireland, and in 1922–3 was elected captain of the Cardiff Rugby Football Club, being the first Irish

international to achieve this honour. Needless to say, in due course he was made a member of the famous Barbarians Club. He was greatly interested in Welsh golf and was a member of the Royal Porthcawl and Glamorganshire clubs; he also became captain of the Erratics Golfing Society—no small honour. It is a hard thing—albeit a privilege—to write an obituary of one of one's oldest friends. I think it was Sir Hugh Walpole who wrote that it's not life that matters but the courage with which we face it. Tom Wallace exemplified that—and a far greater thing: he faced a certain death, of which he was fully aware, with superlative bravery.

Dr. Stella Churchill, who was in the public health service before she became a medical psychologist, died in Mentone on September 16 at the age of 71. Stella Churchill was born in Birmingham on June 5, 1883, the eldest daughter of the late George Myers, and was educated at Edgbaston High School and at Girton College, Cambridge. Three years after leaving Cambridge she married Mr. S. J. A. Churchill, who was formerly British Consul-General at Naples: he died in 1921. Some years after her marriage she decided to take up medicine and became a student at the London School of Medicine for Women, where she qualified in 1917. After holding resident appointments at the Italian Hospital and the Tite Street Hospital for Children she became anaesthetist to the British Red Cross Hospital at Netley in 1918. She took the D.P.H. (Cambridge) in 1921 shortly after her appointment as assistant medical officer of health in Bermondsey, and in 1923 she moved to the Metropolitan Borough of St. Pancras, where she was for a short time deputy medical officer of health. Wishing to take a more active part in public affairs than she could as an official—she was a notably humorous and lively speaker—she retired from the public health service and became a member of the London County Council in 1925, representing South-east Southwark. In the previous year and later in 1929 she was unsuccessful Labour candidate—for North Hackney and Chiswick respectively—in the Parliamentary elections. During this time she maintained her great interest in child welfare, working as medical officer of the West Hackney welfare clinic, as director of the Walworth Sunlight Clinic, and as a member of council of the Save the Children Fund. The value of her work in this field was recognized when she was elected president of the Maternity and Child Welfare Group of the Society of Medical Officers of Health in 1934. Dr. Churchill retired from the L.C.C. owing to ill-health in 1932, and for a time thereafter she was medical secretary to the Diabetic Association. In more recent years she became deeply interested in psychotherapy, and held appointments on the staff first of the Tavistock Clinic and later of the West End Hospital for Nervous Diseases. During the early part of her career she wrote a number of papers on maternity and child welfare, and also several books, including *Nursing in the Home* (1924), *Health Services and the Public* (1928), and *On Being a Mother* (1936). Her most recent book, *The Adolescent and the Family*, published in 1949, was written primarily for the instruction of parents. Mrs. Churchill had two children, a son and a daughter.

Dr. E. J. Fitzgerald, who was a member of the medical staff of the Home Office, died suddenly on September 22. Edward Joseph Fitzgerald studied medicine at Cork, Dublin, and Manchester, graduating M.B., B.Ch., B.A.O. in 1928, and proceeding to the M.D. of the National University of Ireland in 1934. After qualifying, and until the outbreak of the 1939–45 war, he served in various mental hospitals, eventually becoming medical superintendent of the Royal Eastern Counties Institution at Bridge Home, Witham, Essex. He was a Territorial, and during the early part of the war served in the R.A.M.C. with the rank of major, being invalided after Dunkirk. He then joined the Ministry of Pensions as senior medical officer in the neuropsychiatric branch. Transferring to the Home Office in 1949, he served as medical officer in the department which deals with the complex controversial problem of vivisection—a problem to which he brought his own immense energies, powers of concentration, and personal charm. He was in full harness up to the day before his death.

F. E. writes: The sudden death of Dr. E. J. Fitzgerald, or "Fitz" as he was widely known, has come as a great shock to the many people who were associated with him in his work at the Home Office, his colleagues outside this sphere, and those fellow members of the Institution of Professional Civil Servants whom he represented on the National Executive Council of that organization. Out of his many interests, and one to which he gave much of his energy, one must single out his championing of the medical officers within the Civil Service. He donated prodigious thought, time, and drive to any problem connected with the status and remuneration of this rather inarticulate body and to any injustice which he considered had been done. A great number of us owe a considerable debt to him, for one must concede that "Fitz," in addition to his kindly nature and understanding of people's problems, was above all a fighter—he would fight all the way for his professional colleagues and never count the cost. For this we must be very grateful. He leaves a widow and three children, to whom we extend our most sincere sympathy in their loss.

Medico-Legal

PATIENT TO PAY

Mr. D. Freeman Coutts, registrar at West London County Court, gave judgment with costs on September 20 for a doctor whose bill was stated to have included a charge of 4s. 6d. for each of three telephone calls a private patient made to him in one day. Dr. Bernard Sweetman, of Ormonde Gate, Chelsea, sued Mr. Ralph Rider, of Monserrat Road, Putney, for fees of £8 19s. 6d.

Mr. Rider told the registrar that he was suffering from heart trouble and this had resulted in his losing his position as his firm's representative. He was now self-employed in commercial photography, but his weekly income was about 50s. Questioned by the registrar, Mr. Rider said his wife was a teacher and went out during the day. This meant that he had to get his meals out. He owned the house in which they lived. His wife, he said, always paid her own bills and had settled her share of the doctor's bill. Mr. Rider said that the doctor had charged him 4s. 6d. for each of three separate phone calls Mr. Rider had made to him on the same day he (the doctor) came to visit him.

Dr. Sweetman said he used his discretion in making charges to private patients.

The registrar gave judgment for Dr. Sweetman for £6 7s. with costs, the amount claimed less £2 12s. 6d. already paid by Mrs. Rider to the doctor for professional services.

INFANT'S DEATH FROM BORON POISONING

[From Our Medico-Legal Correspondent]

On August 20, 1954, Mrs. Olive Dovey, of Sandycroft, near Chester, the mother of five children, found that her youngest child, Terence, who was then 1 month old and had been off his food for two days, was developing blisters round his mouth. From previous experience with her other children she diagnosed these as thrush, and she proceeded to treat Terence, as she had previously treated her other children, by rubbing his mouth with a glycerin and borax solution. She had had a bottle of this by her in the house, but had to get a new bottle from the chemist for Terence on August 21.

Mrs. Dovey regarded glycerin and borax as "a kind of well-known remedy for this sort of thing," and had used it since the child was born "to keep his mouth clean." The glycerin and borax which she used was the ordinary solution of one part sodium biborate to six parts of glycerin, and contained some 12% of borax on analysis.

On August 23, since the baby was still poorly, Mrs. Dovey called in the doctor, and Terence was admitted that afternoon to the Chester City Hospital, where on September 1 he died.

At the inquest held by the Chester city coroner, Dr. Thomas Holliday, consultant pathologist for the Chester area, gave evidence that boron was found in the urine during life and in the urine taken from the bladder at the post-mortem examination. Examinations carried out at the North-western Forensic Science Laboratory at Preston disclosed the presence of boron in the large intestine and in the contents of the small intestine, and traces were also found in the stomach contents and the blood. None was found in the tongue, kidney, brain, or pericardial fluid.

Dr. Holliday's conclusion was that the child's death was caused by boron poisoning, the source of which was the glycerin and borax solution used for the treatment of the thrush from which he was suffering.

A verdict was recorded of death by misadventure.

Universities and Colleges

UNIVERSITY OF LONDON

Dr. C. F. Harris has been re-elected Dean of the Faculty of Medicine for the period October 1, 1954, to September 30, 1956.

Professor P. A. Buxton, F.R.S., has been appointed Heath Clark lecturer for 1956.

The following have been appointed or nominated for appointment or re-appointment as representatives of the University on the governing bodies of the institutions indicated in parentheses: Sir Archibald Gray, Dr. C. F. Harris, and Dr. A. Topping (British Postgraduate Medical Federation); Sir James Paterson Ross and Dr. John Forest Smith (Guy's Hospital Medical School); Dr. J. R. Bignall (Royal Cancer Hospital); Dr. M. I. A. Hunter and Professor J. Whillis (Royal Dental Hospital of London, School of Dental Surgery); Professor J. Z. Young, F.R.S., and Mr. E. G. Slesinger (St. George's Hospital Medical School); Professor W. C. W. Nixon (St. Mary's Hospital Medical School); Professor R. Hare (St. Mary's Hospital Medical School—Wright-Fleming Institute); Mr. J. P. Hedley (St. Thomas's Hospital Medical School); Sir Charles Harington, F.R.S., and Sir Archibald Gray (University College Hospital Medical School); Dr. A. J. W. Beard (King's College School, Wimbledon); Professor S. J. Cowell (National Society's Training College of Domestic Subjects); Dr. H. B. May (Queen Mary College).

The following have been recognized as teachers of the University in the subjects indicated in parentheses: *St. George's Hospital Medical School*, Dr. J. S. Anderson (Medicine), Dr. S. C. Gold (Dermatology), Dr. N. F. C. Gowing (Pathology). *King's College Hospital Medical School*, Mr. R. C. F. Catterall (Orthopaedics). *Charing Cross Hospital Medical School*, Dr. W. E. D. Evans (Pathology). *Guy's Hospital Medical School*, Dr. P. J. Helliwell (Anaesthetics), Dr K. S. MacLean (Medicine). *Institute of Child Health*, Dr. B. Levin (Pathology).

The William Julius Mickle Fellowship for 1953–4 has been awarded to Dr. Audrey U. Smith (National Institute for Medical Research) in respect of the work on the preservation of living cells and tissues at low temperatures which she has carried out during the past five years.

The following degrees were awarded by the Senate in July:

M.D.—C. O. S. B. Brooke, Josephine M. Lord. *Old Regulations, Branch I:* Ruth M. Cammock.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

At a meeting of the Council of the College held on September 25, the following were admitted to the Fellowship:

Sir Stanford Cade, C. F. Krige, Eileen M. Whapham.

The following were admitted to the Membership:

G. J. Arendt, A. L. Baccarini, K. G. Ball, A. W. Banks, J. M. Barrett, A. E. R. Buckle, D. E. Burgess, J. D. Bury, Elizabeth B. Butler, D. J. Cassidy, K. W. Cochrane, J. V. M. Coppleson, J. Crossley, P. H. Crowe, G. T. M. Cummins, B. Danzig, Sheila P. Davidson, D. J. Dooley, Mary M. Essex-Lopresti, R. A. W. Feakes, J. P. B. Fitzgerald, C. B. Gangamma, R. G. Gudex, Muriel S. Hill, M. H. Jameson, E. W. Jeyaratnam, D. Keith, B. L. G. Kneale, Marjorie A. C. Kuck, W. Lees, G. A. Lewis, G. D. R. Lilburne, W. P. McLaughlin, M. C. Macnaughton, Joan Marshall, P. W. Mitchell, Marjorie C. B. Moore, H. O'Hara, D. L. Phillips, H. M. Pretorius, W. L. G. Quinlivan, J. Roper, L. Rubin, B. M. Sandler, S. S. Gupta, K. K. Sharma, Pamela M. Smith, D. Tacchi, J. G. A. Troup, J. Walsh, J. N. Ward, H. W. Wilson.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **September 18** (No. 37) and corresponding week 1953.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	9	1	6	0	0	16	0	7	0	
Dysentery	305	34	161	0	2	206	35	76	1	2
Encephalitis, acute	3	0	0	0		2	1	0	2	
Enteric fever:										
Typhoid	5	2	0	0		1	0	0	1	
Paratyphoid	10	1	2(B)	1		16	0	0	0	
Food-poisoning	224	9		1		194	15		4	
Infective enteritis or diarrhoea under 2 years				22	27				16	47
Measles*	1,286	87	154	20	35	1,049	20	36	27	22
Meningococcal infection	23	0	11	2		29	5	11	1	
Ophthalmia neonatorum	39	0	3	0		20	5	2	1	
Pneumonia†	230	15	109	1		193	8	104	4	
Poliomyelitis, acute:										
Paralytic	58	3	9	2	2	120	9	10	23	7
Non-paralytic	34	3				117	5			
Puerperal fever§	201	37	7	1		219	27	14	1	
Scarlet fever	426	20	82	14	29	443	23	115	21	29
Tuberculosis:										
Respiratory	740	67	111	43				127	32	
Non-respiratory	100	9	22	5				22	4	
Whooping-cough	1,688	67	113	8	20	4,170	402	457	29	42

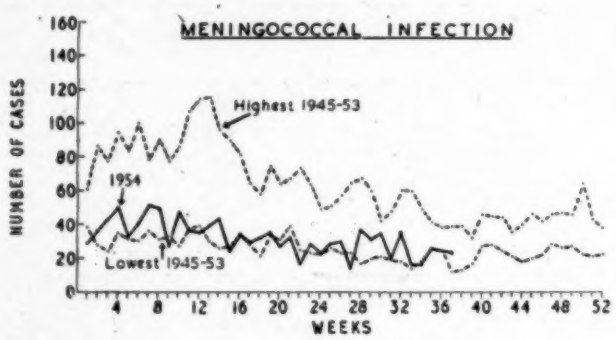
DEATHS in Great Towns	1954					1953				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0	0	0	0	0	0	0	0
Dysentery	0	0		0		0	0		0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	6	1	0	1	1	12	2	1	0	1
Influenza	2	0	0	0	1	1	0	0	0	0
Measles		0	0	0	0		0	0	0	
Meningococcal infection		0	1				0	2		
Pneumonia	122	19	14	4	4	112	16	13	8	2
Poliomyelitis, acute	1	0			0	5	2			0
Scarlet fever		0	0	0	0		0	0	0	0
Tuberculosis:										
Respiratory	69	10	9	3	1	60	10	6	3	3
Non-respiratory		0	11	1	1		3	4	0	1
Whooping-cough	0	0	0	0	0	4	0	1	2	0
Deaths 0–1 year	175	22	17	5	13	217	22	25	8	18
Deaths (excluding stillbirths)	4,340	625	497	78	137	4 075	562	502	98	137
LIVE BIRTHS	7,152	1030	804	211	342	7,461	1117	855	218	329
STILLBIRTHS	185	22	25			180	15	22		

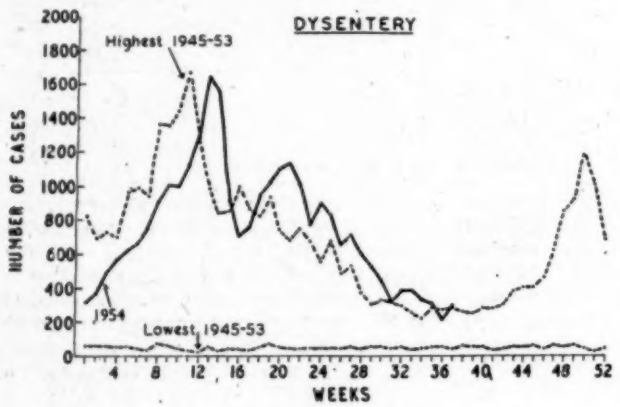
* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

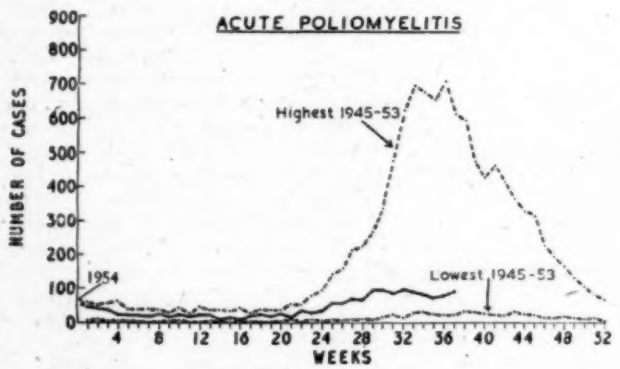
Vital Statistics

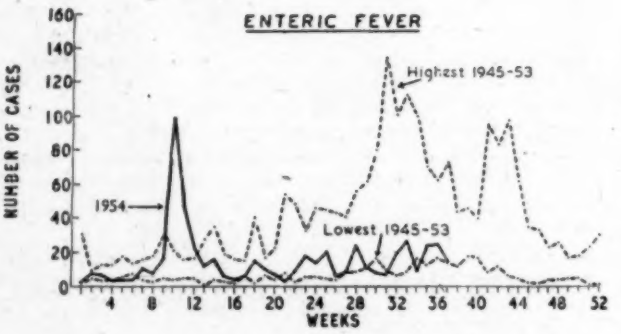
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1945–53 are shown thus - - - - - - -, the figures for 1954 thus ———. Except for the curves showing notifications in 1954, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Infectious Diseases

The largest rises in the number of notifications of infectious diseases in England and Wales during the week ending September 18 were 203 for measles, from 1,083 to 1,286, 113 for scarlet fever, from 313 to 426, 90 for dysentery, from 219 to 309, while the only large fall in incidence was 346 for whooping-cough, from 2,014 to 1,668.

The increase in the incidence of measles was mainly contributed by the northern section of the country, but the only large rise was 132 in Lancashire, from 376 to 508. The largest rises in the local trends of scarlet fever were 23 in Yorkshire West Riding, from 30 to 53, 22 in Lancashire, from 55 to 77, and 20 in Staffordshire, from 12 to 32. 9 cases of diphtheria were notified, being 3 fewer than in the preceding week. The chief feature of the returns of diphtheria was a fall in Lancashire from 6 to 2. The largest falls in the notifications of whooping-cough were 86 in Lincolnshire, from 109 to 23, 36 in Kent, from 152 to 116, and 42 in London, from 109 to 67. The large fall in Lincolnshire was due to Louth R.D., where only 2 cases were notified compared with 62 in the preceding week.

92 cases of acute poliomyelitis were notified, and these were 11 more for paralytic and 3 more for non-paralytic cases than in the preceding week. The largest returns were Lancashire 8 (Liverpool C.B. 5); Nottinghamshire 8 (Nottingham C.B. 2, Worksop M.B. 2, Southwell R.D. 2); Durham 7 (Houghton-le-Spring U.D. 2); London 6 (Wandsworth 3); Yorkshire East Riding 6 (Kingston-upon-Hull C.B. 4); Yorkshire North Riding 6; Suffolk 6 (Gipping R.D. 2, Melford R.D. 2).

The largest centres of dysentery were Lancashire 47 (Liverpool C.B. 14, Manchester C.B. 10); London 34 (Finsbury 10); Yorkshire West Riding 29; Warwickshire 23 (Nuneaton M.B. 22); Surrey 21; Leicestershire 21 (Leicester C.B. 12).

Week Ending September 25

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 526, whooping-cough 1,566, diphtheria 8, measles 1,415, acute pneumonia 251, acute poliomyelitis 84, dysentery 308, paratyphoid fever 11, and typhoid fever 2.

Medical News

War Memorial Dedication.—The War Memorial will be dedicated by His Grace the Lord Archbishop of Canterbury on Tuesday, November 2, at 3 p.m. The Archbishop will be attended by Dr. E. D. Jarvis, the Moderator of the Church of Scotland, and Dr. A. Drummond Harcus, ex-Moderator of the Free Church Federal Council, representing the Moderator. Singing will be led by the Choir of the Queen's Chapel of the Savoy, and music provided by the R.A.M.C. Band. The ceremony will consist of a short religious service, during which the Memorial will be unveiled by the President of the Association. Officers of the Association, members of Council, relatives of the fallen and others will be present. Academic robes will be worn. Tickets may be obtained from the Secretary of the Association. Early application is advised as accommodation is somewhat limited.

Ergot on Cereal Crops.—A report in *The Times* last week drew attention to the presence of ergot disease on spring-sown wheat in Lincolnshire this season. Local inquiries confirm that the incidence, while patchy, is heavier than in most years, and this is put down to the very wet summer. Professor J. H. Burn and Mr. R. L. Lucas, of the Departments of Pharmacology and Agriculture respectively at Oxford, writing in the correspondence columns of the same newspaper, also report an unusually heavy infection of rye grass and other wild grasses in Bedfordshire, Berkshire, and Oxfordshire, and raise the question of whether ergotism could account for some of the recent cases of abortion in cattle for which no bacterial cause has

been found. So far as the risk to humans is concerned, nearly all outbreaks of ergotism have followed the eating of heavily infected rye bread. The last important epidemic in England was in Manchester 26 years ago, when 200 of the Jewish population of the city were affected (see *British Medical Journal*, 1928, **1**, 302). The remarkable outbreak of epidemic madness in the small Provençal village of Pont Saint Esprit in 1951 was ascribed to ergot poisoning, but final proof of this seems to have been lacking. However, there was no doubt about the part that bread had played in the outbreak (*British Medical Journal*, 1951, **2**, 650).

Middlesex Hospital Dinner.—The annual dinner of the Middlesex Hospital Medical School was held at the Savoy Hotel, under the chairmanship of Professor R. W. SCARFF, on October 1. Nearly 400 members of the staff and past and present students assembled. Among those at the high table were Major the Hon. J. J. Astor, chairman of the hospital; Sir Harold Boldero, until very recently dean; Lord Horder, Lord Moran, Lord Webb-Johnson, Sir Russell Brain, Bt., P.R.C.P., Sir John Charles, Sir Harold Himsworth, the Directors-General of the three armed Services, and the Mayor of St. Marylebone. Professor SCARFF, in proposing the health of the hospital and medical school, spoke of the great loss they had sustained in Sir Harold Boldero's retirement, and extended a warm welcome to the new dean, Professor B. W. Windeyer. Recommending the students to cultivate the minor vices lest they succumbed to a major one, Professor Scarff delighted his audience with an apt quotation from a recent cancer report: "Chemical carcinogenesis in mice," the report declared, "is delayed, and possibly prevented, by prolonged consumption of alcohol." In responding, Professor WINDEYER also paid tribute to Sir Harold Boldero, who, he said, had held the deanship for 20 years, more than one-sixth of the corporate life of the school. His retirement, three months ago, had overshadowed all the events of the school year. During his term of office the school had undergone a radical reorganization. Owing to the intervention of the war Sir Harold Boldero had not been able to do all that he had planned, but he had seen the completion of the block which now housed the school administration, the library, and certain of the departments, and it was difficult to imagine how the school could have met present demands without these additions to its accommodation. He was far and away the best committee-man the speaker had ever known, and one of the best pieces of work he had done for the school was to persuade Major Astor to take over the chairmanship of the school council as well as the hospital. A response to the toast was also made by Dr. D. C. F. MUIR, Senior Broderip Scholar, who described some of the athletic achievements of the school. Mr. D. H. PATEY, in proposing the health of the Chairman, spoke of Professor Scarff's brilliant work as scientific secretary of the British Empire Cancer Campaign; he had that very day been made honorary secretary of the campaign. Referring to Professor Scarff's directorship of the Bland-Sutton Institute of Pathology, Mr. Patey said that next year would see the centenary of the birth of Bland-Sutton, a famous name in Middlesex annals. Bland-Sutton had left Middlesex not merely a building but a tradition of research and service, to which the directors and workers at the Institute remained faithful.

King's College Hospital Medical School Dinner.—The organizers of this dinner, held on October 2 under the chairmanship of Sir WILLIAM GILLIATT, must have been gratified by the large attendance of past and present King's men and women. The Great Hall of the Royal College of Surgeons was completely filled. Dr. CHARLES NEWMAN, dean of the Postgraduate Medical School, proposing the toast to the King's College Hospital Medical School, spoke of the dangers of regimentation and standardization—"any sort of originality is being crowded out." At King's, though the teachers were engaged in multifarious activities, they put teaching first. In reply the dean of the school, Dr. V. F. HALL, mentioned the difficulty of correlating medical education with the rapid advances in medical science and treatment. Young doctors should keep constantly in mind the proper relationship between patient and doctor. In conclusion Dr. Hall said that Sir William Gilliatt was making his last official appearance as chairman of the medical school council: his guidance over the past five years had meant much to the school, which owed him a great debt of gratitude. Sir WILLIAM GILLIATT, whose health was drunk before he rose to propose the toast to the guests, said he had never seen so many people he knew so well, and he congratulated the King's men and women on the *esprit de corps* which had brought them there. He spoke particularly on the good relations established between the medical school and the South-East Metropolitan Regional Hospital Board, which had provided in the Dulwich Hospital 200 additional teaching beds. Mr. K. I. JULIAN, chairman of the regional hospital board, made a brief reply.

Medical Research in Australia and New Zealand.—Two years ago the Life Offices' Association for Australasia started a fund, known as the Life Insurance Medical Research Fund of Australia and New Zealand, with the object of financing research on cardiovascular disease in that continent. This year the Fund has awarded grants-in-aid totalling £25,000 to eight departments as follows: Clinical Research Unit, Alfred Hospital, Melbourne (cardiac vibrations and energy production in the myocardium); Department of Pathology, University of Melbourne (dissecting aneurysm); Department of Pathology, University of Sydney (role of hypertension in arterial degeneration and atherosclerosis); Department of Pharmacology, University of Sydney (influence of drugs on cardiac contraction); Hallstrom Institute of Cardiology, Royal Prince Alfred Hospital, Sydney (pulmonary changes in mitral stenosis); Clinical Research Unit, Royal Prince Alfred Hospital, Sydney (portal hypertension); and Department of Medicine, University of Otago (pathogenesis and treatment of hypertension).

Association of Clinical Pathologists.—For their 53rd general meeting the Association of Clinical Pathologists went to Brighton, where for three days they heard and discussed some 30 technical papers and demonstrations. The meeting was held on September 30 and October 1 and 2 in the Conference Hall of the Grand Hotel. The presidential address was given by Dr. E. N. DAVEY, of Gloucester, who chose as his subject "The General Practice of Clinical Pathology." He began with some wise advice to the young pathologist. He should not be lured too much by the excitement of following a rarity. "Remember," said Dr. Davey, "common things are the most common." Those should be studied; likewise the pathologist must be ready to perform the commonly demanded examinations. Passing to the future of the clinical pathologist—"there must be a limit to the number of specialists our economy can support"—Dr. Davey asked if the clinical pathologist was to remain uneasily poised between technician and clinician, to be in time eliminated altogether. No pathologist could retain the respect of his technicians if he neglected to familiarize himself with technical detail; on the other hand he was a clinician and his place was at the bedside. It was up to him to make his medical and surgical colleagues accept him as a consultant in his own right. The chairmen of the various sessions of the meeting were Professor DOROTHY RUSSELL, Dr. E. H. GILLESPIE, Dr. C. J. C. BRITTON, Dr. C. E. DUKES, Dr. J. A. SMYTH, and Dr. E. M. DARMADY.

Hunterian Society.—Dr. W. S. C. COPEMAN, the president, received a large number of members and guests of the Hunterian Society at the Society's annual cocktail party on September 30 in the rooms of the Ciba Foundation, London. Downstairs there was a fine display of Hunterian relics, with Mr. ROBERT RUDOLPH, the honorary curator of the Society's museum and library, in attendance to describe them to the visitors.

Royal Cancer Hospital.—By a statutory order which came into force on September 30 the name of the Royal Cancer Hospital has been changed to the "Royal Marsden Hospital."

COMING EVENTS

London Nursing Exhibition.—October 11–15 at the Seymour Hall, London, W.1.

Scientific Basis of Medicine.—The inaugural lecture in this series of lectures, sponsored by the British Postgraduate Medical Federation, will be given by Professor A. V. HILL, C.H., F.R.S., at 5.30 p.m. on October 19 at the Senate House, University of London, Malet Street, W.C.1. His subject is "Why Biophysics?"

Yorkshire Association of Graduates of Glasgow University.—Annual dinner on October 22 at the Victoria Hotel, Bradford. Inquiries to the secretary, Mr. James Wishart, 33, Manor Row, Bradford, 1.

Langdon-Brown Lecture.—Dr. E. F. SCOWEN will lecture on "Some Endocrine Factors in Breast Cancer" at the Royal College of Physicians on October 26 at 5 p.m.

British Epilepsy Association.—Bazaar to raise £4,000, October 28 at Caxton Hall, Westminster, S.W.1, 11.30 a.m.–7 p.m.

Semon Lecture.—Professor E. HUIZINGA (Groningen) will lecture on "Bronchological Pneumonology," at the Royal Society of Medicine, London, on November 4 at 5 p.m.

Maudsley Lecture.—Professor WILDER PENFIELD, F.R.S. (Montreal), will lecture on "The Role of the Temporal Cortex in Certain Psychical Phenomena," at the Royal Society of Medicine, London, on November 4 at 2.15 p.m.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Saturday, October 9

●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—At Queen Charlotte's Maternity Hospital, 11.15 a.m., Professor W. I. C. Morris: Maternal Injuries in Obstetrics.

OXFORD UNIVERSITY.—At Radcliffe Infirmary, Oxford, 9.15 a.m., Dr. Paul Wood: Mitral Valve Disease.

SOUTH-EAST METROPOLITAN REGIONAL TUBERCULOSIS SOCIETY.—At Grove Park Hospital, Marvels Lane, Lee, S.E., 10.30 for 11 a.m., "Brains Trust." Speakers, Professor H. D. Trimble (California), Dr. R. Y. Keers, Mr. H. Morriston Davies and Dr. B. A. Dormer (South Africa). Question Master, Dr. M. M. Nagley.

Monday, October 11

●INSTITUTE OF NEUROLOGY.—5.30 p.m., Dr. M. J. F. McArdle: Disorders of Ocular Movement of Infra-nuclear Origin.

●INSTITUTE OF OBSTETRICS AND GYNAECOLOGY.—At Chelsea Hospital for Women, 4.30 p.m., Professor W. C. W. Nixon: Tumours Complicating Pregnancy.

MEDICAL SOCIETY OF LONDON.—8.30 p.m., general meeting. Presidential Address by Sir Horace Evans: Bedside Bias.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. G. H. Macnab: Congenital Abnormalities of the Gastro-intestinal Tract; 6.30 p.m., Mr. R. J. Furlong: Repair of Tendons.

Tuesday, October 12

CHELSEA CLINICAL SOCIETY.—At Rembrandt Hotel, Thurloe Place, S.W., 8.30 p.m., discussion to be opened by Mr. Kenneth Walker: Sex Problems in General Practice.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. C. O. Carter: Genetics in Dermatology.

LONDON UNIVERSITY.—At St. Mary's Hospital Medical School (Wright-Fleming Institute Lecture Theatre), 5.30 p.m., special university lecture in physiology by Dr. Arpad Csapo (Washington): Myometrial Function and its Endocrine Regulation.

OXFORD UNIVERSITY MEDICAL SOCIETY.—At Maternity Department, Radcliffe Infirmary, 8.15 p.m., Dr T. C. N. Gibbens: Psychiatric Aspects of Murder.

●ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5.15 p.m., Mr. A. W. Badenoch: Tumours of the Kidney; 6.30 p.m., Professor R. P. Jepson: Ischaemia.

WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY.—5.30 p.m., Mr. G. Minton: Ocular Manifestations in Nervous Disease (Part I).

Wednesday, October 13

BIRMINGHAM MEDICAL INSTITUTE: SECTION OF PSYCHIATRY.—At 154, Great Charles Street, 6 p.m., joint meeting with Midland Branch of the British Psychological Society. Dr. H. J. Eysenck, Ph.D.: A Theory of Anxiety and Hysteria.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. I. W. Whimster: Normal and Abnormal Embryology in the Skin (Part I).

INSTITUTE OF UROLOGY.—4.30 for 5 p.m., Mr. A. R. C. Higham: Enuresis.

MIDLAND MEDICAL SOCIETY.—At Grand Hotel, Birmingham, Centenary dinner and inaugural meeting.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—2 p.m., Dr. A. Neuberger: Porphyrin Metabolism.

SCOTTISH EASTERN ASSOCIATION OF MEDICAL WOMEN'S FEDERATION.—At Pharmacology Lecture Theatre, Edinburgh University, Teviot Place, 8 p.m. Open meeting. Dr. Margaret MacK. Methven will show film on "A Two-year-old Goes to Hospital."

Thursday, October 14

BOURNEMOUTH PHARMACEUTICAL SOCIETY.—At Grand Hotel, Bournemouth, 7.30 p.m., Mr. Harold Davies, Ph.D., F.R.I.C.: Prescribing and the National Health Service. Members of the Bournemouth Division, B.M.A., are invited.

BRITISH INSTITUTE OF RADIOLOGY.—8 p.m., Dr. M. Lederman: Some Applications of Radioactive Isotopes in Ophthalmology; Dr. N. G. Trott, Ph.D., and Dr. W. K. Sinclair, Ph.D.: Construction and Measurement of Beta-Ray Applicators for use in Ophthalmology; Mr. G. S. Innes, B.Sc., and Dr. I. G. Williams: Physical and Clinical Applications of Cobalt 60 in the Treatment of Glioma of the Retina.

INSTITUTE OF DERMATOLOGY.—5.30 p.m., Dr. R. W. Riddell: Structure of Pathogenic Fungi.

LONDON HOSPITAL MEDICAL COLLEGE.—At Bearsted Theatre, 5 p.m., Schorstein Memorial Lecture by Mr. A. C. Perry: Some Surgical Aspects of Anaemia.

LONDON UNIVERSITY.—At Westfield College, 5.15 p.m., Inaugural Lecture by Sir Lionel Whitby: Devils, Drugs, and Doctors.

NORTH-WESTERN TUBERCULOSIS SOCIETY.—At Clinical Theatre, Manchester Royal Infirmary, 5 p.m., Presidential Address by Dr. E. H. W. Deane: Some Problems of Primary Infection.

NUFFIELD ORTHOPAEDIC CENTRE, Wingfield-Morris Orthopaedic Hospital, Oxford.—8.30 p.m., Professor W. Mercer: Paget's Disease of Bone.

ROYAL ARMY MEDICAL COLLEGE.—5 p.m., Dr. J. R. Rees: Significance of Psychiatry.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—5 p.m., Moynihan Lecture by Dr. Oswaldo P. Campos (Brazil): One Thousand Cases of Bone and Joint Tuberculosis.

ST. ANDREWS UNIVERSITY.—At Physiology Department, Medical School, Small's Wynd, Dundee, 5 p.m., Professor E. G. T. Liddell, F.R.S.: Control of Muscle.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL.—5 p.m., Sir Paul Mallinson: psychiatry demonstration.

SURREY INTER-HOSPITAL PSYCHIATRIC ASSOCIATION.—At Manor Hospital, Epsom, Surrey, 5.30 p.m., clinical meeting.

WESTMINSTER HOSPITAL MEDICAL SCHOOL STUDENTS' UNION.—At Westminster Medical School, 8 p.m., joint meeting of Osler Club and Westminster Medical School Guthrie Society. Subject: Can and Should Public Speaking be Taught to Medical Students. Speakers, Dr. W. R. Bett, Mr. N. A. Punt, and Sir Adolphe Abrahams.

Friday, October 15

BIOCHEMICAL SOCIETY.—At National Institute for Medical Research, The Ridgeway, Mill Hill, London, N.W., 2.30 p.m., scientific papers.

BRITISH INSTITUTE OF RADIOLOGY.—5 p.m., meeting of medical members.

INSTITUTE OF DISEASES OF THE CHEST.—5 p.m., Dr. N. C. Oswald: clinical demonstration.

CHICHESTER AND DISTRICT HOSPITALS CLINICAL SOCIETY.—At St. Richard's Hospital, 8.15 p.m., Dr. G. D. Read: Natural Childbirth.

FACULTY OF RADIOLOGISTS: RADIOTHERAPY SECTION.—At Royal College of Surgeons of England, 5 p.m., papers by Sir Harold Boldero, Dr. Phyllis Wade, and Dr. Ralston Paterson: Teaching of Radiotherapy.

●INSTITUTE OF DERMATOLOGY.—5.30 p.m., clinical demonstration by Dr. J. E. M. Wigley: Eczema.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY.—4.30 p.m., annual address by Mr. R. H. Franklin: Some Advances in the Surgery of the Oesophagus.

POSTGRADUATE MEDICAL SCHOOL OF LONDON.—(1) 2 p.m., Mr. L. N. Pyrah: Uses of the Ileum in Genito-urinary Surgery. (2) 4 p.m., Dr. A. F. Foster-Carter: Applied Anatomy of the Bronchi.

Saturday, October 16

BIOCHEMICAL SOCIETY.—At National Institute for Medical Research, The Ridgeway, Mill Hill, London, N.W., 11.30 a.m., scientific papers.

APPOINTMENTS

EAST ANGLIAN REGIONAL HOSPITAL BOARD.—K. A. Taylor, M.B., B.Chir., Surgical Registrar, Peterborough Memorial Hospital; R. D. Lalloo, M.B., Ch.B., Medical Registrar, County Hospital, Doddington; W. B. Wright, L.M.S.S.A., Registrar in Mental Deficiency and Child Psychiatry, Little Plumstead Mental Deficiency Hospital Group; E. G. Perry, M.B., Ch.B., Surgical Registrar, East Suffolk and Ipswich Hospital; N. A. Green, M.B., B.S., and F. G. O. Burrows, M.B., B.Ch., Surgical Registrar, Norfolk and Norwich Hospital; E. J. C. Wynne, M.B., B.Chir., Surgical Registrar, West Norwich Hospital.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Robins.—On August 29, 1954, at the Royal Devon and Exeter Hospital, to Shirley (formerly Winter), wife of Robert H. C. Robins, F.R.C.S., a daughter—Elizabeth Mary.

Ward Platt.—On September 28, 1954, to Patricia (formerly Frodsham), B.M., B.Ch., D.C.H., wife of Walter E. Ward Platt, A.I.Mar.E., of Akaroa, 11, Deeside, Whitby, Wirral, Cheshire, a son—Martin Peter.

MARRIAGES

Eustace—Musgrave.—On June 26, 1954, at St. Alban's Church, Bournemouth, Hants, Philip Faulder Eustace, M.B., B.Ch., to Jean Musgrave, M.B., Ch.B., D.Obst.R.C.O.G.

DEATHS

Coke.—On September 26, 1954, at the County Hospital, Hertford, Herts, William Francis Harriott Coke, F.R.C.S., aged 78.

Kerrigan.—On September 18, 1954, at Weston-super-Mare, Somerset, Owen Joseph Mary Kerrigan, L.R.C.P.&S.I.&L.M., Surgeon Commander, R.N., retired.

MacIntyre.—On September 25, 1954, in hospital, Glasgow, Marion MacIntyre, M.B., Ch.B., late of Belfast, and Manchuria.

Marshall.—On September 21, 1954, at Tree Tops, Woolton, Liverpool, Charles McIntosh Marshall, M.B., F.R.C.S.

Matthews.—On September 26, 1954, at Ashfield, Mill Lane, Heatley, near Warrington, Lancs, George William Matthews, M.R.C.S., L.R.C.P., aged 67.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

On Going Bald

Q.—*A healthy 28-year-old male has progressively lost hair along the anterior margin of the scalp during the past few months. The hair remaining in that area is thin and fine. Except for a very little dandruff the rest of the scalp and hair appear normal. What treatment do you advise? Would oestrogen-containing ointment used locally be of help?*

A.—This loss of hair is evidently the onset of calvities. It is to be expected that some thinning of the hair on the vertex will occur before long, and it is not possible to say how far the condition will progress. Very often calvities starts in the third decade; it progresses rapidly for two or three years and after this the hair loss is much more gradual. Endocrine factors are of very great importance in determining calvities; the condition is extremely common in men, particularly as age advances; and in a minor degree is often seen in women after the menopause. In women also it may be part of masculinization due to endocrine upset. In spite of this the precise hormonal factors are not known, and when calvities occurs in the male there is no detectable endocrine abnormality. The incidence of dandruff is also partly determined by endocrine factors, so that calvities and dandruff often co-exist. It seems probable, however, that dandruff does not cause calvities; it is therefore doubtful whether treatment of dandruff has any influence on the loss of hair.

It has been claimed that the local application of oestrogens to the scalp will influence calvities in men, but it is difficult to believe that it will do this without the production of general effects. In a few cases in which oestrogen creams have been used for the treatment of calvities in women the results have been indeterminate. In fact, it is doubtful whether any treatment has much influence on the progress of the condition. Excessive massage is undoubtedly harmful and may make matters worse. A mild stimulating lotion such as the following may be useful:

℞ Chloral hydrate 2 parts
Salicylic acid 3 parts
Castor oil 4 parts
Spirit to 100

Probably the best advice to give the patient is that he should resign himself to his state and not waste a lot of money on expensive treatments.

Ankylosing Spondylitis

Q.—*There appears to be a great deal of confusion with regard to the early diagnosis of ankylosing spondylitis, and I would be grateful if you would kindly let me know: (a) the early diagnostic features, both clinical and radiological; (b) whether it is a specific disease, not associated with any other other form of arthritis; and (c) the importance of the sedimentation rate in this condition.*

A.—The diagnosis of ankylosing spondylitis should be considered in anyone complaining of recurrent back pain and stiffness, particularly if the patient is a young adult male. Clinical features in favour of spondylitis are: (1) pain felt diffusely around the pelvis or at several levels in the trunk; (2) increased stiffness after rest and some malaise or weight loss; (3) reduced spinal mobility involving mainly the lumbar region and affecting rotation and lateral bending as well as flexion and extension; (4) reduced chest expansion. These features should serve to distinguish spondylitis from the more common back and sciatic pain that results from disk disorders. Involvement of hips, shoulders, and knees often occurs at a later stage of spondylitis, but some limitation of hip motion is occasionally an early finding and the patient may in fact present with a painful hip which may be considered tuberculous if the possibility of spondylitis is not borne in mind. Transient pain and swelling of peripheral limb joints is occasionally observed at the onset of spondylitis and does not rule out the diagnosis, though spondylitis is essentially a disease of the spine and limb girdles. Focal tender points over the ischial tuberosities, around the iliac crests and over costochondral junctions are also characteristic findings. A history of iritis is strong supportive evidence, since about one in four patients with spondylitis develops iritis sooner or later.

The spondylitic process starts in the sacro-iliac joints and the earliest radiological changes consist of widening and irregularity of these joints with surrounding fluffy osteosclerosis. Spinal changes usually occur much later and the early radiological findings consist of blurring of the interfacetal joints, but this is difficult to demonstrate. New bone formation in the outer layers of the annulus fibrosus of the disks is also an early change and gives the lumbar vertebral bodies a characteristic "squared" appearance in the lateral radiographs.

The sedimentation rate is usually raised when the spondylitic process is actively progressing, but may be normal when the disease is stationary. The sedimentation rate may therefore be normal even in patients with widespread ankylosis, provided the process is not active at the time of investigation.

Typical ankylosing spondylitis is probably a specific disease entity, and its early diagnosis is important, because the spondylitic process appears to be significantly aggravated by immobilization and improved by *x*-ray therapy. Ankylosis affecting only the cervical spine is often found in patients who have had rheumatoid arthritis in childhood, and ankylosis of the sacro-iliac joints may occasionally be seen in patients with widespread rheumatoid arthritis. Ankylosis of the spine and sacro-iliac joints may also be found in patients with venereal arthritis and in adults suffering from recurrent attacks of rheumatic fever. These atypical forms of spondylitis do not appear to benefit from *x*-ray therapy, but as yet the diagnostic criteria for distinguishing these atypical forms from typical ankylosing spondylitis have not been fully worked out.

Switzerland for Pulmonary Tuberculosis

Q.—*A woman of 30 with unilateral pulmonary tuberculosis has been treated by chemotherapy and the induction of an artificial pneumothorax. Her husband now insists that she should go to Switzerland to convalesce. At what stage will she benefit most from the Swiss climate? Are there certain centres in Switzerland which specialize in the treatment of tuberculosis, and how may I get in touch with a Swiss physician to maintain the pneumothorax, etc.?*

A.—There is now general agreement that the supposed benefits of the Swiss climate have been greatly overrated. There is little or no point in a patient going to Switzerland in the summer, when the climate in this country is at its best; the Swiss winter climate is, however, much more pleasant than ours. In the case quoted, in which the disease has been controlled by chemotherapy and pneumothorax treatment, there is certainly no special indication for treatment in Switzerland.

There are centres in Switzerland which specialize in the treatment of tuberculosis, among which Davos is probably the most famous. The Kurverein, Davos, will provide a list of sanatoria, physicians, and charges; also the National Association for the Prevention of Tuberculosis (Tavistock House North, Tavistock Square, London, W.C.1) maintains liaison with the Swiss sanatorium authorities and will give information.

Chemotherapy in Scarlet Fever

Q.—*Should cases of scarlet fever be treated by penicillin or sulphonamides?*

A.—Most clinicians of experience have not been impressed with the value of sulphonamides in scarlet fever. They have, of course, no direct effect against toxaemia, and evidence of appreciable improvement in the local throat condition is lacking. It is believed that there is a lessened tendency to secondary septic complications—for example, otitis media—but these occurrences are so uncommon to-day that it is hard to get acceptable statistical evidence in support of this. The writer is more impressed with the value of penicillin and uses it almost exclusively, although occasionally combined with sulphonamides. The usual course is of seven days, comprising an initial injection of 500,000 units of the crystalline preparation followed by a daily maintenance dose of 300,000 units of procaine penicillin for the average child or adolescent. If the case is septic the dose should be substantially increased and the spacing shortened. If toxaemia is present antitoxic serum is invaluable combined, if desired, with penicillin therapy.

Controlled Respiration in Bulbar Poliomyelitis

Q.—*What place has curarization and controlled respiration in the treatment of respiratory paralysis in poliomyelitis pending the availability of an iron lung or other mechanical respirator? I recently had a rapidly fatal case (in 48 hours from onset) on board ship, and I wondered if controlled respiration might have saved the patient.*

A.—Controlled (positive-pressure) respiration is entirely suitable for cases of poliomyelitis requiring artificial respiration, especially when there is paralysis of swallowing, and has recently been advocated by Lassen[1] and Crampton Smith *et al.*[2] An intratracheal cuffed tube may be used for 6–12 hours, but for longer periods a cuffed tracheotomy tube is necessary: curare is not usually required except in cases of tetanus, as reported by Shackleton.[3] A simple mechanical pump to maintain positive-pressure breathing such as was used by Crampton Smith and his colleagues might be very suitable for use on board ship where tank respirators are not available.

REFERENCES

[1] *Lancet*, 1953, 1, 37.
[2] Ibid., 1954, 1, 939.
[3] Ibid., 1954, 2, 155.

Duration of Pregnancy

Q.—*How reliable is the height of the uterus in estimating the duration of pregnancy in an uncomplicated case? I was taught that the pregnant uterus became palpable at the symphysis pubis at the 12th week, but quite often it can be felt two or three weeks earlier. What is the best method of estimating the age of the pregnancy when there is doubt about the date?*

A.—Estimation of the duration of pregnancy by the height of the uterine fundus alone is a very rough method, but is rather more reliable between the 16th and 36th weeks than at other times. Although the fundus is ordinarily palpable just above the symphysis pubis at about the 12th week, it can often be felt abdominally earlier than this. Indeed, in thin women with relaxed abdominal muscles the top of the normal non-pregnant uterus can sometimes be felt suprapubically. The height of the uterus is affected by all manner of factors—and not least by a loaded rectum and full bladder. Moreover, some uteri are longer and narrower than others, so the experienced obstetrician usually (and often subconsciously) makes an allowance for width when calculating from the height. Thus, provided he carries out a bimanual examination, he is usually able to make a clear distinction between an 8, 12, and 16 weeks pregnancy.

From the 26th week onwards, assessment of duration of pregnancy is sometimes best made by judging the size of the foetal head, but this again requires experience. Near term, other factors can be taken into consideration—the entry of the presenting part into the pelvis, effacement of the cervix, and the sensitivity of the uterus. All these clinical methods, however, are obviously uncertain, because the size of normal babies varies enormously, while the size of the uterus depends also on the amount of liquor present. Again, there is a natural tendency to estimate the height and size of the uterus in relation to the size of the mother or the length of her trunk—so in a tall woman it is easy to underestimate the duration of pregnancy and *vice versa*.

Radiological estimation of foetal maturity is equally unreliable, for it depends on the size of the baby in whole or in part, the general deposition of calcium in the skeleton, and the time at which various centres of ossification appear—and all of these vary widely within normal limits. The time at which a woman experiences quickening is also an uncertain guide.

In any particular case, reliance should not be placed on any single observation but on all the evidence which can be assembled. In this respect it is sometimes helpful in the late weeks to refer back to earlier estimates of the duration of pregnancy. The expert obstetrician, taking into account all the findings, both clinical and radiological, often underestimates or overestimates the duration of pregnancy by at least two weeks, so, when the date of the last menstrual period is known, he usually prefers to rely on this rather than on physical signs.

The Family Ghost

Q.—*What are the cause and treatment of the creaking of the joints of a young man whose state of health is good and whose only other complaint is alopecia? When going upstairs or along a corridor he sounds like the family ghost.*

A.—This condition has no known cause. It is probable, though of course unproved, that the creaking arises in the sheaths of the muscles and tendons around the joints, and not in the joints themselves. In any case, this creaking appears to be of no untoward significance. It is not a warning of any form of arthritis, and, though it causes some patients a great deal of alarm, this alarm is unjustified. There is, unfortunately, no useful treatment which can be recommended.

Corrections

The acknowledgment at the end of the article entitled "The Collagenous Changes in the Intervertebral Disk with Age and Their Effect on Its Elasticity" by Mr. A. Naylor, Dr. F. Happy, and Mr. T. Macrae (*Journal*, September 4, p. 570) should have read: "Use of equipment provided by the Wool Textile Research Council at the Bradford Technical College for work on the structure of wool is gratefully acknowledged."

In Table III of Professor C. B. Perry and Dr. W. A. Gillespie's article "Intramuscular Benzathene Penicillin in the Prophylaxis of Streptococcal Infection in Rheumatic Children" (*Journal*, September 25, p. 729) the figure for the total swabs in March to June, 1953, should have been 432 and the percentage of positive swabs 43.1.

We regret that an error was made in the legends for the figures (reproduced on the special plate) which accompanied the paper by Dr. H. B. Fell, Sir Edward Mellanby, and Dr. S. R. Pelc (*Journal*, September 11, p. 611), entitled "Influence of Excess Vitamin A on the Sulphate Metabolism of Chick Ectoderm Grown in Vitro." Figs. 1*a* and 2*a* were stained (haematoxylin) sections (×600) with autoradiographs and not unstained sections, phase contrast. The sections shown in Figs. 1*b* and 2*b* were not the same sections as Figs. 1*a* and 2*a*, but were adjacent.

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